Climate Action Plan
Somerville, Massachusetts

Proposed by:
Commission on Energy Use
and Climate Change

July 2003

Acknowledgements

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Table of Contents

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Executive Summary

Atmospheric scientists agree that the Earth's climate is changing with disruptive consequences for our health and security, and that human activities, particularly the burning of fossil fuels, are a major cause of what is often referred to as "global warming."

An inventory of greenhouse gas emissions for the City of Somerville establishes a baseline for emissions reduction targets and identifies areas of potential savings. In 1997, Somerville used a reported 7,700 million BTUs of energy, producing 734,762 tons of CO_2—or 9.5 tons CO_2/person/year.

Following its enactment of emissions reduction goals in 2001, the City appointed a Commission on Energy Use and Climate Change (CEUCC) in April 2002 and charged it with recommending measures to use energy more efficiently and to reduce local greenhouse gas emissions. Over the next year the Commission, with assistance from City officials, local and regional experts, and concerned members of the public, set about the task of preparing an Action Plan. Its recommendations build upon existing municipal policies and practices that have already increased energy efficiency and have reduced energy consumption. Action items identified as high priorities in the Plan satisfy three criteria:

1) The potential to reduce greenhouse gas emissions substantially, with a premium placed on measures that could produce results quickly;
2) Achievability, both from technological and cost perspectives;
3) The likelihood that they would be embraced and implemented.

Section I: Municipal Policies and Practices

The City has already implemented numerous energy efficiency measures. The CEUCC's recommendations are intended to help the City go even further in reducing its greenhouse gas emissions by implementing and maintaining a systematic and effective energy efficiency program at the municipal level.

Action Item 1: Establish a Program of Energy Efficiency and Conservation Retrofits in Municipal Buildings

Energy and conservation retrofits should be implemented in order to reduce consumption of fossil fuels, electricity, and water. Municipal buildings created roughly 60% of all

municipal emissions in 1999, or 12,400 tons of CO_2. Retrofits could reduce emissions from individual buildings by 10% to 20% before 2010. An intern from Tufts University is working with the Department of Public Works and the Commission through the summer of 2003 to complete a building inventory and energy audits for municipally owned buildings and to determine which municipal buildings are the best candidates for energy and conservation retrofits.

Action Item 2: Implement a Municipal Green Procurement Policy

A municipal green procurement policy for such major purchases as the City fleet of vehicles and transportation contracts, as well as for day-to day purchases such as exterior and interior lighting, equipment, computers, appliances, and control systems will ensure that newly purchased items have the greatest energy efficiency for their intended use, thereby reducing emissions.

Action Item 3: Appoint a Municipal Energy Manager

An Energy Manager would track greenhouse gas emissions for the City, implement reduction measures, and advise municipal officials regarding actions that would decrease the City's emissions. A manager could facilitate a 10% per year reduction in greenhouse gases over seven years— up to 15,000 tons of CO_2 by 2010.

Action Item 4: Promote Use of Bicycles as Primary Vehicles

The City should promote the use of bicycles as primary vehicles by commuters and residents. The use of bicycles and public transportation rather than personal motorized vehicles would reduce the amount of fossil fuel burned for transportation, would save individual automobile owners money on the maintenance of vehicles, and would reduce automotive pollution.

Action Item 5: ***Evaluate Options for Purchasing Municipal Green Power***

The City should undertake an annual review of available options for green power purchasing and, as it becomes feasible, the City should consider purchasing green power to meet at least a portion of its electricity needs. By purchasing green power to meet 10% of the City's electricity load, for example, the city would reduce CO_2 emissions by about 1,100 tons each year. The City would also reinforce its commitment to renewable energy, to decreasing dependence on fossil fuels, to supporting a local economy, and to a healthier environment.

<u>Additional Municipal Recommendations</u>

- ❍ Encourage green building practices for all municipal building renovation and construction: Green building practices improve the environment while saving money. When a building is selected for renovation, the City should ensure that the project managers thoroughly examine the potential application of green building practices.
- ❍ Enforce the statewide anti-idling law: Massachusetts prohibits the idling of most vehicles for longer than five minutes. By enforcing this law more effectively, Somerville can reduce greenhouse gas emissions and other pollutants while directly improving community health.
- ❍ Promote green space: Preservation of existing green space will promote

and protect public health and the general quality of life in the city. The Commission supports the recommendations of the Somerville Open Space Plan to establish a tree committee to survey and protect trees, to adopt a "no net loss" policy for City-owned open space parcels and to add new open spaces, and to expand the existing "adopt a spot" program in the City.

❍ Support public transportation: The Commission strongly recommends continuing City support for the MBTA Urban Ring transit route, an MBTA Orange Line stop at Assembly Square, and extension of the Green Line through Somerville.

❍ Create an award program for municipal employees: City employees who make suggestions that significantly promote energy efficiency and energy cost savings and that minimize the municipality's impact on climate change should be recognized and rewarded.

Section II: Residential Opportunities and Recommendations

Residential energy consumption is the largest contributor to greenhouse gas emissions in Somerville, with 46% of greenhouse gas emissions coming from residential buildings. An effective plan to reduce residential energy consumption must address the specific needs of homeowners, tenants, and students, living in single-family houses, large apartment buildings, and facilities for the elderly. The Plan includes two residential action items and a series of additional recommendations that can help Somerville residents reduce greenhouse gas emissions, often at a significant savings for the household budget.

Action Item 6: Launch and promote the "Somerville Sees the Light" campaign

The goal of "Somerville Sees the Light" is to convert the equivalent of one incandescent bulb per household to an energy-efficient compact florescent lightbulb (CFL) within one year. Somerville Climate Action will undertake a widespread media campaign to educate Somerville residents about CFLs, to promote their availability in the community and to promote their use. By starting with this achievable goal—one bulb changed by each household—this campaign could create a significant reduction in residential greenhouse gas emissions, making a substantial contribution toward the City's overall 10% reduction goal.

Action Item 7: Initiate a Green Sanctuary program

The Plan recommends participation in a well established program to make houses of worship more energy efficient, both by reducing greenhouse gas emissions from the buildings in which congregations meet and by encouraging congregants to take energy efficiency measures in their own homes. The short-term goal is for one congregation to sign up for the Interfaith Power and Light (IP&L) program in 2003, with others to follow in subsequent years. The Plan envisions that 10% of congregants in each participating congregation will commit to energy efficiency measures at home by 2007.

<u>Additional Residential Recommendations</u>

❍ Promote home insulation: Insulating a home can save up to 30% of the energy consumed for heating and air conditioning. Utility-sponsored rebate programs are available for many types of home insulation.

❍ Outreach to first-time home-buyers: The Commission will prepare a presen-

tation about home insulation and energy conservation for use during courses for first-time home buyers sponsored by the Office of Housing and Community Development.

❍ Promote walk to school programs: The Commission supports “Shape up Somerville”—a Tufts University School of Nutrition project that helps Somerville parents and children learn strategies to avoid obesity and its associated health risks. The creation of safe walking routes to the city's 10 elementary schools to increase students' daily physical activity is a key element of the project.

❍ Promote tree planting and maintenance: Trees and plants counterbalance the heat island effect, the higher temperatures experienced in urban areas where asphalt, brick, and concrete retain and give off heat. The Commission supports Groundwork Somerville in activities that add shade trees and other plant life to the City.

❍ Home insulation ordinance: An ordinance requiring that specific insulation be installed in homes at the time of property transfer or during major renovations would reduce greenhouse gas emissions significantly. While such an ordinance is not feasible for Somerville at this time due to a lack of inspectors, this is an effective tool that should be considered in the future.

Section III: Commercial and Industrial Opportunities and Recommendations

Somerville’s commercial sector is responsible for approximately 221,339 tons of CO_2 per year, or 30% of the greenhouse gas emissions in the City. A reduction in commercial and industrial energy consumption can have a sizable impact on reductions for the entire community. The Plan includes two action items that can substantially reduce greenhouse gas reductions by Somerville businesses.

Action Item 8: Reduce Commercial CO_2 Emissions By Implementing Energy Efficiency Measures

The City should support and promote energy efficiency in local businesses through energy efficiency programs already set in place by local utilities. NSTAR offers programs that promote energy efficiency, provide free energy audits, and offer low-cost installation of energy efficiency upgrades to commercial lighting fixtures, electronic building controls, HVAC, and other mechanical equipment. A Retrofit Program is targeted to small businesses. The CEUCC has already begun promoting these programs in concert with NSTAR and the Somerville Chamber of Commerce.

Action Item 9: Promote Green Practices in New Construction and Renovation

Adoption of “green building” practices for new construction and during renovation of existing commercial and industrial buildings should be encouraged through an incentive-based zoning and permitting process to be implemented by 2004. At least 10% of new buildings or renovations should follow recommended practices by 2007—20% by 2010. Greenhouse gas emissions reductions will be significant, since increased energy efficiency reduces heating and cooling requirements.

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Introduction

The reality of climate change—its nature, its causes, and its short and long term effects—has been verified by the world's leading atmospheric scientists, who now agree that human activities, particularly the massive burning of fossil fuels, are likely responsible for much, if not all, of what has come to be known as global warming.

In January 2001 the Intergovernmental Panel on Climate Change (IPCC)—the authoritative, global body of scientists that has been studying the problem for decades—cited "new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities."[1] Subsequent evaluations of the IPCC's conclusions, including a major review undertaken by the US National Academy of Sciences in 2002, have only strengthened the underlying consensus: human industrial and commercial activities—along with the cumulative results of individual behavior patterns—are changing our climate with dangerous consequences for the environment and for public health.

What can be done about climate change? More to the point of this Action Plan, what can a municipality such as Somerville do to reduce its greenhouse gas emissions in order to play a role in stabilizing the world's climate while there is still time to make a difference? Fortunately, there are many steps the city can take-and is already taking-that can reduce emissions and that make economic sense at the same time.

In this introduction to our proposed Climate Action Plan for the City of Somerville, the Commission on Energy Use and Climate Change (CEUCC) will briefly describe the scientific consensus about climate change and its effects, recap the City's recent history in addressing the problem, and explain the goals and structure of the Plan itself.

Why Is Our Climate Changing?

Carbon dioxide (CO_2) and other "greenhouse gases," which accumulate in the Earth's atmosphere, radiate heat back to the surface.† This "greenhouse effect" is what makes life on Earth possible. For the past 10,000 years or more, up to the1800s, CO_2 concentrations in the atmosphere had been stable at about 280 parts per million (ppm). By 1998 they had

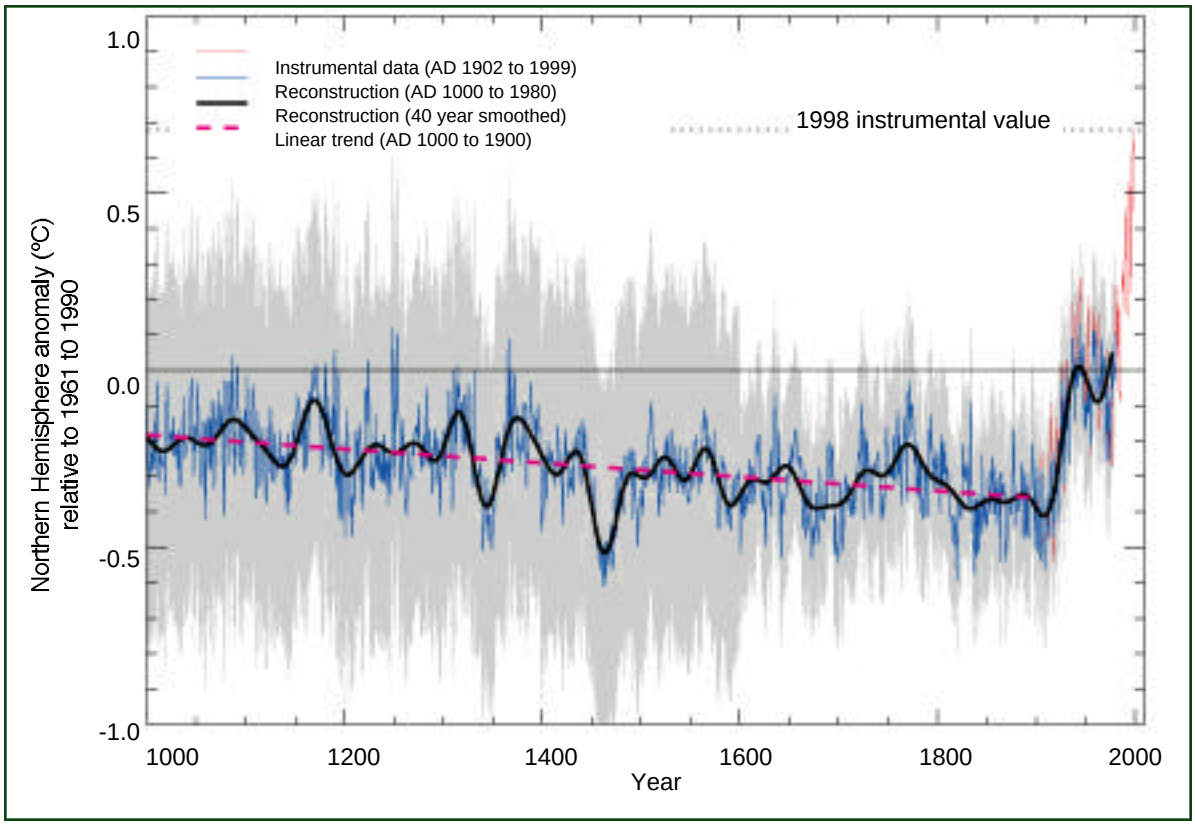
† The major greenhouse gases emitted in urban areas are carbon dioxide (CO_2) and methane (CH_4). Nitrous oxide (N_2O) is also a greenhouse gas. Since CO_2 emissions are the primary concern in nearly all discussions of climate change, the term "eCO_2" is sometimes used to indicate that equivalent amounts of CH_4 and N_2O have been factored into various calculations. Throughout this report, we have preferred the reader-friendly terms "CO_2" and "tons CO_2," with the understanding that equivalent amounts of the other greenhouse gases are also implied when we estimate amounts of CO_2 generated or saved.

reached 360 ppm and are projected to rise to 450-600 ppm by the middle of this century.[1]

The overall warming of the Earth's surface has been rapid, pronounced, and well documented. According to the IPCC the global average surface temperature increased about 0.6ºC over the 20th century—"the largest [increase] of any century during the past 1,000 years." The 1990s was the warmest decade and 1998 the warmest year on record during that time.

The IPCC projects that by 2100 the average global surface temperature will increase by 1.4º to 5.8°C (3º to 10ºF). To put these numbers in context, the last ice age was accompanied by temperatures only 5º to 9º C (9º to 16º F) cooler than those to which we have been accustomed, and the last time CO_2 concentrations reached projected levels, dinosaurs walked the Earth! According to the IPCC, the present CO_2 concentration "has not been exceeded during the past 420,000 years and likely not during the past 20 million years." Moreover, the current rate of increase is unprecedented during at least the past 20,000 years.

Where is all of this CO_2 coming from? Some of it is the result of natural processes, but human activities-primarily the burning of fossil fuels but also deforestation and other land use practices—are pumping massive amounts of CO_2 into the atmosphere where it will remain for hundreds of years.



Millennial Northern Hemisphere (NH) temperature reconstruction (blue) and instrumental data (red) from AD 1000 to 1999 shows dramatic increases in average temperatures during the past two centuries of the industrial age. *Source: Intergovernmental Panel on Climate Change, Working Group 1. 2001.*

What Are the Effects of Climate Change?

Climate scientists have warned that the consequences of our rapidly warming climate could be far reaching and—in the worst case—dire. Some of the anticipated effects have already been observed. Glacial ice is melting at a frightening pace and rising sea levels threaten island populations and coastal areas. Extreme weather events have become more

intense and more numerous in recent years-another climate change indicator. Droughts in some parts of the world and flooding in other parts have also intensified.

The IPCC expects such changes are likely to continue throughout the 21st century, including higher maximum temperatures, higher minimum temperatures, fewer cold days and frost days, more intense precipitation events in some areas, increased risk of drought in others, increases in tropical cyclone precipitation and peak wind intensities, and a rise in global mean sea level between 0.09 to 0.88 meters (3.5 inches to 2.9 feet) by 2100.

Changes of this magnitude will affect everything from human health to agriculture and food security, biodiversity and marine ecosystems, hydrological systems and water resources—indeed, every aspect of life on Earth that has created a comfort zone for human habitation.

What Can Somerville Do?

A certain amount of climate change is now inevitable and will affect many generations to come because of the persistence of greenhouse gases in the atmosphere once they have accumulated there. Preventing the most catastrophic effects will require a global commitment to stabilize CO_2 concentrations, in particular, to as close to current levels as possible.

The concentration of greenhouse gases in the atmosphere is the cumulative result of billions of individual behaviors: the kinds of vehicles we drive and how much we drive them; how we heat and cool our homes and businesses; the efficiency of our appliances; the kinds of lighting we use; how much we reuse and recycle consumer goods; even the number of trees in our neighborhoods.

Such stabilization requires that CO_2 emissions be reduced to less than half their current levels globally. While this is a very ambitious goal, there are effective ways to reduce these emissions and we need to start encouraging individuals, businesses, and governments to implement them. To demonstrate the feasibility of such reductions and to set examples that will motivate our national political bodies, many cities and towns—and even entire states and regional partnerships—across the country have decided to begin reducing their greenhouse gas emissions now. At its most basic level, after all, the concentration of CO_2 and other greenhouse gases in the atmosphere is the cumulative result of billions of individual behaviors: the kinds of vehicles we drive and how much we drive them; how we heat and cool our homes and businesses; the efficiency of our appliances and other machinery; the kinds of lighting we use; how much we reuse and recycle consumer goods; even the number of trees in our neighborhoods and the quality of our natural areas and open spaces.

While Somerville's contribution to climate change is a minuscule part of the global total, our efforts as a community to reduce local greenhouse emissions will encourage other communities to follow our lead, building momentum for a global solution. There are many ways to make these reductions and many offer the additional benefit of reducing fuel costs. There are many ways to do so and many offer the additional benefit of reducing fuel costs. Some approaches are more effective than others; some will begin to save money almost immediately; others will require an initial investment that will be recovered over time—usually a short time.

In August 2001, the New England Governors and Eastern Canadian Premieres issued a climate change action plan for the region calling for reduction in greenhouse gas emissions to 1990 levels by the year 2010 with a long-term goal of reduction of 75 to 85 percent

below current levels. A number of municipalities are heeding the call to action by writing and implementing their own plans. This is a chance for Somerville to be among the leaders, and set an example for its residents, who all make countless energy consuming decisions in their lifetimes.

Where Are We Now? How Did We Get Here?

The City has already taken many steps in the right direction. The following is a very abbreviated chronology of significant events:

- ❍ In the summer of 2000, Somerville residents concerned with the implications of climate change formed Somerville Climate Action (SCA) and, over the next several months, engaged in a program of public education and outreach to municipal officials who shared their desire to develop local approaches to this global problem.
- ❍ SCA joined the Massachusetts Climate Action Network (MCAN) to ensure that initiatives taken in Somerville would complement those taken elsewhere in the Commonwealth. Participation in MCAN has also created opportunities for regional partnerships, for joint funding approaches, and for collaboration on action plans similar to this one that have been developed by task forces in Arlington, Brookline, Cambridge, Medford, and other neighboring cities and towns.
- ❍ In November 2000 the Board of Aldermen voted unanimously to establish a "Clean Air Task Force" for the City. This would eventually lead to the creation of the City's Commission on Energy Use and Climate Change, whose members were appointed by Mayor Dorothy Kelly Gay in April 2002 and whose first task was to write this Climate Action Plan.
- ❍ In February 2001, the Aldermen submitted a resolution to Mayor Gay, which she immediately signed, endorsing the Clean Cities Program of the International Council for Local Environmental Initiatives (ICLEI). This cleared the way for Somerville to obtain the services of an ICLEI intern who completed an inventory of the City's greenhouse gas emissions over the summer of 2001 (see below).
- ❍ On August 8, 2002, the Aldermen passed a resolution calling on the City of Somerville to reduce its emissions of CO_2 and other greenhouse gases to 1990 levels by the year 2010, and to further reduce emissions to 10% below 1990 levels by the year 2015.

The action items recommended in this Plan have been developed by the Commission on Energy Use and Climate Change because we have concluded that they can have the greatest immediate impact in achieving those emissions reductions goals in ways that are both affordable and cost effective for the City, its residents, and its businesses.

The ICLEI Inventory

ICLEI intern Kristin Marcell conducted an inventory of greenhouse gas emissions for the City at both the municipal operations level (using data from fiscal year 1999 as the base) and at the community level (1997 base year data). The goal of this inventory, which was necessarily

approximate, was to establish a baseline for emissions reduction targets and to identify areas of inefficient or wasteful energy use that could be singled out for special attention.

The complete ICLEI report was submitted to the City in September 2001 and is available as a public document.[2] The principal conclusions are summarized as follows:

- In 1997 the Somerville community used 7,700 million BTUs of energy, producing 734,762 tons of CO_2. This amounted to 9.5 tons CO_2/person/year. By comparison, in that same year, Arlington produced 335,063 tons of CO_2 (7.6 tons/ person/year), and in 1995 Medford produced 696,112 tons of CO_2 (12.1 tons/person/year).
- The greatest amount of energy use and greenhouse gas emissions in the community that year (76%) resulted from the heating, cooling, and lighting of residential, commercial, and municipal buildings. Private vehicular transportation also resulted in substantial emissions (21%).
- Community greenhouse gas emissions may be expected to increase by 27,000 tons of CO_2—or 3.7%—by 2010 if no action is taken to reduce emissions.
- In 1999 the Somerville City government spent more than $3.1 million on energy use related to buildings and operations producing 20,525 tons of CO_2 emissions, the majority from building energy use (60.3%), followed by the vehicle fleet (14.4%), streetlights (12.8%), and waste disposal (12.5%).

The ICLEI report went on to summarize progress that the City had already made in addressing its energy use practices and made numerous recommendations for additional measures. This Action Plan builds on the ICLEI proposals by suggesting priorities and spelling out detailed implementation steps, budget impacts, and timetables.

The City has already taken numerous steps to increase energy efficiency, to reduce energy consumption, and to protect the environment. These existing municipal policies and practices are a strong foundation on which to build an even more effective and systematic program of energy conservation and emissions reductions.

What Has Somerville Already Accomplished?

Even before the establishment of this Commission and the enactment of specific greenhouse gas emissions reduction goals, the City had taken numerous steps to increase energy efficiency, to reduce energy consumption, and to implement other practices that protect the environment. The City has made several municipal buildings more energy efficient, has installed high-pressure sodium street lamps and LED traffic lights, and has converted electric water heaters to gas heat at a number of schools. An active recycling and recycled products purchasing policy has been expanded to include the purchase of energy efficient computer equipment as older systems are upgraded and replaced.

These existing municipal policies and practices are a strong foundation on which to build an even more effective and systematic program of energy conservation and emissions reductions. The action items in this Plan are offered as further steps along the path to energy efficiency and environmental responsibility on which the City has already embarked.

The Action Plan: Process and Structure

This Action Plan was researched and written over a 14-month period, from April 2002 to June 2003, by the Commission on Energy Use and Climate Change, with substantial input from SCA members and local experts on energy efficiency in the fields of building construction and renovation, transportation, energy management, conservation, and education. All Commission meetings were open to the public under the City's open meetings laws. Broad public participation has been one of the Commission's most important goals from the beginning, and is reflected in the recommendations that follow.

The sections of the Plan were drafted by three Working Groups: 1) municipal; 2) residential; 3) commercial and industrial. A fourth Working Group on goal setting and education concurrently developed the overall structure of the Plan; considered outreach and implementation strategies; and networked with MCAN and other community groups. The final draft of the Plan was compiled, edited, and approved by the Commission as a whole, which is solely responsible for the recommendations it offers.

In order to qualify as a high priority Action Item, the recommendations in this Plan had to satisfy three criteria:

1) The potential to reduce greenhouse gas emissions substantially, with a premium placed on measures that could produce results quickly;
2) Achievability, both from technological and cost perspectives;
3) The likelihood that they would be embraced and implemented.

At every step in the development of the Action Items that follow, appropriate staff members of City departments, representatives of local businesses, Somerville residents, and others who will be responsible for the implementation of this Plan, were consulted in an effort to ensure that the recommendations made here are not only achievable, but also build on foundations that already exist. We believe that each of the recommendations that follows meets the above criteria and it is the intention of the Commissioners, in the months ahead, to nurture the kinds of residential/business/municipal partnerships that can make this Plan a reality.

Evaluation and Next Steps

One year from the publication of this Action Plan, the CEUCC will review the progress that has been made toward implementing each of the Action Items and will issue a "report card" on the success of the Plan as a whole.

In addition to the fully developed Action Items that start each of the three sections, the Plan also contains other suggestions for reducing greenhouse gas emissions in each category. The Plan itself is a work in progress; as it evolves we expect many of these less developed recommendations to take on the status of Action Items in their own right.

References

1. Intergovernmental Panel on Climate Change. Summary for policymakers: a report of Working Group I of the Intergovernmental Panel on Climate Change. IPCC: 2001.
2. ICLEI. Somerville Greenhouse Gas Emissions Inventory Report. September 2001.


WALK

Section I
Municipal Policies and Practices

Introduction

Municipal government has a pivotal role to play in the successful implementation of this Climate Action Plan. The City has already shown strong support for measures to increase energy efficiency and to encourage environmentally sustainable practices. Over the last decade, Somerville municipal officials have implemented a variety of energy efficiency measures with the goal of minimizing the City's energy bills. While saving thousands of dollars, these proactive measures have also reduced local CO_2 output. What follows is a brief description of major energy retrofits undertaken by the City.

Streetlight Retrofits: Acting with the NSTAR utility, the Department of Public Works (DPW) Lights and Lines Department has replaced 4,100 street lamps (virtually every one in the City) with high-pressure sodium lamps. On average, the replacements saved approximately 265 watts per lamp, ultimately saving the City thousands of dollars of avoided electricity costs per year. In addition, 90% of lights for parks, squares, and underpasses were upgraded to high-pressure sodium, providing even greater savings for the City.

Upgrade from Electric Heating to Gas: The Lights and Lines Department has also completed a partial upgrade of five municipal buildings from electric heating to gas. These buildings include the Powderhouse Community School, the Winter Hill Community School, the Lincoln Community School, the East Somerville Community School, and the Central Fire Station. At these locations, the city converted electric water heaters to gas heat and opted to heat large open spaces such as gymnasiums with natural gas instead of electricity.

Power Factor Penalties: Power factor is a measure of the efficiency of electricity use on a scale of 0 to 1, with 1 signifying greatest efficiency. Each time a building's power factor drops below 0.9—typically when older motors are turned on—the City is charged $50-60. These incidents can cost the City thousands of dollars in penalties per year. To ameliorate the problem, the Lights and Lines Department decided to install power factor corrections in each school listed above. Power factor corrections are similar to capacitors and they smooth out the electricity demand throughout the day. Each system cost approximately $12,000 for each school.

Traffic Lights: The Traffic and Parking Department is in the process of replacing the incandescent bulbs in all red and green traffic lights to Light Emitting Diodes (LEDs). The Department is also replacing pedestrian "Don't Walk" signs with LEDs. The capital costs of the upgrades are reimbursed by NSTAR Electric. When completed, the upgrades will save the City approximately 570,000 kWh of electricity—or 436 tons CO_2—annually. This is close to a $68,000 savings per year when calculated at the current cost of electricity of $0.11/kWh.

Computers: Most municipal computers are less than three years old and are therefore Energy Star certified. City policy for the past three years has required that all computers be turned off at night. As the city continues to update its computer systems, the Management Information Services (MIS) department will strive to obtain flat screen monitors, which are significantly more efficient than traditional cathode ray tube desktop monitors. Flat screen monitors are quite expensive, although prices are becoming more competitive.

Somerville has already taken important steps toward saving energy and reducing greenhouse gas emissions by installing LED walk signs and traffic lights.

Environmentally Preferred Purchasing: The City of Somerville has an active recycling and recycled products purchasing policy called Environmentally Preferred Purchasing (EPP). In 1996, Somerville enacted its EPP program and since that time, the City has increasingly spent more of its operating budget on materials with recycled content. From FY 2000 to FY 2002, dollars per capita spent on EPP by the Municipal Purchasing Department increased from $1.13/capita to $3.78/capita. (Part of this increase reflects the implementation of a more effective record-keeping system which tracks expenses incurred on recycled products). Among the City's environmentally friendly purchases are recycling containers, compost bins, high-recycled-content paper, energy-efficient lighting, rechargeable batteries and power stations, automatic light sensors, and energy-saving light bulbs. Recycling also cuts emissions of the greenhouse gas methane, which is emitted in large quantities from landfills.

The Ongoing Role of Municipal Government

The municipal government is responsible for approximately 3% of total greenhouse gas emissions generated within the City, according to the 2001 ICLEI report. While this percentage may seem small, the fact that the City is one of the largest employers in Somerville; oversees highly visible public buildings, such as schools, libraries, and City Hall; and can enact policies that encourage and reward energy efficiency among residents and businesses gives City officials a unique ability to lead by example. One such example is the new Michael E. Capuano School (pre-K-1), which, when completed, will employ state-of-the-art energy efficiency measures as well as a photovoltaic array for solar electricity generation. This precedent-setting design is receiving acclaim both locally and regionally, and is the first Leadership in Energy and Environmental Design (LEED) registered public school in New England.

Many greater Boston communities are working to reduce greenhouse gas emissions in their cities. Communities such as Cambridge, Arlington, Medford, and Brookline have completed emissions inventories and are also part of the Massachusetts Cities for Climate Protection program. To address the collective challenges facing these communities, the Massachusetts Climate Action Network (MCAN) was created, as was CLIMB, a group that includes the Metropolitan Area Planning Council. Leadership from the Mayor's office is needed to communicate and coordinate with local communities to optimize CO_2 reduction efforts and to ensure that, where possible, joint efforts and partnerships increase the opportunities for energy efficiency and sustainability.

The Commission has developed the following action items to assist the municipal government in further reducing its greenhouse gas emissions. Our recommendation that the City appoint an energy manager to coordinate energy efficiency programs across the board is, in our view, very important to the overall success of this part of the Plan. Whether energy management responsibilities are vested in a new position, as we suggest, or are consolidated into an existing job description, the functions themselves are essential to implementing and maintaining a systematic and effective energy efficiency and greenhouse gas reduction program at the municipal level.

Action Item 1
Establish a Program of Energy Efficiency and Conservation Retrofits in Municipal Buildings

Goal and timeframe

Energy and conservation retrofits should be implemented in order to reduce consumption of fossil fuels (such as heating oil and natural gas), electricity, and water. Retrofits include upgrades of HVAC systems, lighting systems, boilers, and chillers; other examples are the installation of low-flow faucet fixtures, replacement of incandescent exit sign lights with LED's, occupancy sensors, and electricity-saving devices for vending machines. Measures that pay for themselves in a

Calculating Emissions of Greenhouse Gases

How many pounds of CO_2 are generated per kWh of electricity? This value depends upon the type of fuel burned by the power plants and how efficiently the plants convert the fuel to electricity. A different conversion factor must be used when calculating the pounds of CO_2 generated per 1 million BTUs of natural gas, since natural gas burns much more efficiently than most other fuels. NSTAR's mix in 2000, for example, was 33% nuclear, 28% natural gas, 17% oil, 8% coal, and 14% from other sources.

We use the following conversions in this report, which are consistent with those used in the 2001 ICLEI emissions inventory:

1 kWh electricity
= 1.53 lbs CO_2

1 million BTU (MMBTU) natural gas
= 118 lbs CO_2

Since 3,412 BTUs = 1 kWh, if all our electricity were generated by natural gas, only 0.4 pounds CO_2 would be generated for every 1 kWh electricity. With the mix of sources of power that we have now, each kWh of electricity generates 1.53 lbs CO_2.

relatively short time-such as one to five years-should be implemented as soon as possible (See Action Item 2: "***Implement a Municipal Green Procurement Policy***" for examples). Other priority retrofits, offering a longer horizon for returns on investment, should be considered once a building inventory and cost/benefit analysis have been completed for each building.

Projected greenhouse gas emissions reduction

According to the 2001 ICLEI report, municipal buildings created roughly 60% of all municipal emissions in 1999, or 12,400 tons of CO_2. We believe retrofits could be identified that would reduce emissions from individual buildings by 10% to 20% before 2010. Further reduction targets should be set as we look beyond the year 2010.

Reason for recommendation

Public buildings generated approximately 60% of municipal greenhouse gas emissions in 1999. Somerville High School, the Department of Public Works, and the Public Safety building were cited in the 2001 ICLEI report as having the greatest overall energy use, although this is not on a normalized basis. Smaller buildings—including the Central and Lowell Fire Stations—had greater energy use per square foot than those listed above.

Reducing energy used in municipal buildings would result in direct benefits on several fronts:

- ❍ reduced combustion of fossil fuels to provide electricity, heat, and cooling to buildings;
- ❍ reductions in airborne particulate matter, wherever emissions are reduced (on or offsite);
- ❍ long term savings to the city from avoided fuel and operational costs;
- ❍ reduced municipal susceptibility to the negative impacts of fuel price spikes.

Person or agency to implement recommendation

The efficiency and conservation retrofits would involve many parties including but not limited to: the Mayor, the Board of Aldermen, facility managers in targeted buildings, DPW (including Buildings, Lights and Lines, and Operations Departments), the Office of Housing and Community Development, Traffic and Parking, Capital Planning, the School Board, City Finances, NSTAR Electric, NSTAR Gas, and Keyspan Energy.

Due to its previous work with NSTAR Electric, NSTAR Gas, Keyspan Energy, and subcontractors, the Department of Public Works already has relationships with these utilities. Therefore, the steps needed to make energy efficiency retrofits are already familiar to city officials.

As mentioned earlier, an intern from Tufts University is working with the Department of Public Works (DPW) and the Commission through the summer of 2003 to complete building inventories for all municipally owned buildings. He will also work closely with NSTAR Electric and their subcontractors to determine which municipal buildings are the best candidates for energy and conservation retrofits.

This lightshelf is part of the energy-efficient design at the new Capuano School, the first Leadership in Energy and Environmental Design (LEED) registered public school in New England.

Implementation steps

Building Inventory: To assess the state of all municipal buildings and their varying levels of efficiency, a thorough building inventory needs to be completed. The Commission has decided to use "Portfolio Manager," the inventory program designed by EPA'S Energy Star office. Important categories include the function of the building, building age, recent renovations, current lighting systems, HVAC systems, motor use, and water consumption. Other data such as an electricity use profile and anticipated renovations or overhauls may be solicited from city officials. Discussions with NSTAR have confirmed that compiling this information would facilitate their planning work. Compiling information on municipal buildings and their energy consumption patterns will lay the groundwork for the next step—a cost/benefit analysis.

Cost/Benefit Analysis: The goal of the cost/benefit analysis is to determine the priority of city building retrofits and to begin capital planning for retrofits that are necessary but that may have longer payback periods. We suggest that the City make use of energy auditing services provided by NSTAR Electric in order to obtain clear estimates of the capital costs and operational savings of retrofits. It is important that an energy audit address all facets of resource use within a building. That is, an energy audit should address electricity, thermal energy, and water consumption within each facility, and should not focus narrowly on one area such as electricity. With the information provided by a complete energy audit, the Energy Manager and/or other appropriate officials can prepare the cost/benefit analysis with assistance from the Buildings Department and others.

The cost/benefit analysis should contain:

- ❍ a list of recommended retrofits for each building, including projected capital costs and life-cycle cost savings for each retrofit;
- ❍ recommended priorities for retrofits based on energy savings, capital costs, and life-cycle cost savings;
- ❍ comprehensive research on utility, state, or federal programs which may offer cost-sharing or grants for retrofits.

Budget/cost implications

Energy and conservation retrofits will require significant time and effort. Energy audits are routinely offered for free by utilities such as NSTAR, which may also subsidize capital upgrades using a shared savings model or via lease-to-own efficiency equipment. The energy audits would comprise the main component of a cost/benefit analysis; additional items include setting priorities for retrofits and identifying financing alternatives.

Sources of funds

NSTAR Electric, NSTAR Gas, and Keyspan Energy manage energy efficiency funds from the Commonwealth's System Benefit Charge, a surcharge on all electric and gas bills. In its most recent filing with the Massachusetts Department of Energy Resources, NSTAR has created a fund exclusively for municipal projects.

Overcoming potential obstacles

In the current economic environment, it will be difficult to allocate the time and resources necessary to complete a thorough cost benefit analysis. If an Energy Manager is hired by the City, more personnel hours would be available to complete this action item. The City may not have the budget flexibility to pay for capital upgrades that are later reimbursed by the utility. A cost/benefit analysis will help identify affordable items as well as items that require long term capital planning.

Measures of success

Energy and conservation retrofits will be considered successful if a report that includes a building inventory and cost-benefit analysis is completed and if energy-efficiency retrofits and conservation measures are implemented that reduce municipal emissions to within 10%-20% of 1999 levels by 2010.

References/Resources

NSTAR Electric and Gas (www.nstaronline.com)
Keyspan Energy (www.keyspanenergy.com)
US Environmental Protection Agency (www.energystar.gov)
US Department of Energy (www.doe.gov)

Retrofit Success Stories

The City of Medford saves 73 tons of CO_2 per year in its city hall and 665 tons of CO_2 at its high school after converting from heating oil to natural gas. As a result of successful negotiations with Keyspan Gas, Medford did not pay any installation costs.

The City of Newton has made extensive use of the utility rebate system. Electrical engineer David Tannozzini has overseen lighting retrofits in more than 30 buildings in three and half years, accessing more than $230,000 of rebates at a cost to the city of just under $50,000. These lighting retrofits save the city more than 400,000 kwh per year, thus recouping their costs in two years. In addition, lighting levels in these buildings have been dramatically improved and the users are quite pleased. Mr. Tannozzini tabulates savings of more than 500,000 lbs. of CO_2 per year.

Action Item 2
Implement a Municipal Green Procurement Policy

Goal and timeframe

The adoption and implementation of a municipal green (environmentally friendly and/or energy efficient) procurement policy will ensure that newly purchased items have the greatest energy efficiency for their intended use. A procurement policy that commits the City to energy efficiency will produce important environmental and economic benefits and should be adopted immediately. More efficient alternatives should be considered for such major purchases as the City fleet of vehicles and transportation contracts, as well as for day-to day purchases such as exterior and interior lighting, equipment, and appliances. Control systems should also be considered to improve the efficiency of electrical appliances, vending machines, and overhead lights. Somerville has a good record in purchasing Energy Star computers to minimize energy consumption. Expanded municipal procurement of Energy Star appliances such as air conditioners, televisions and refrigerators will cut down on emissions and operating expenses.

Projected greenhouse gas emission reductions

Adoption of a green procurement policy will help to continually cut the greenhouse gas emissions in Somerville. Every time a more energy-efficient item is purchased to replace a worn-out item, or a control system is purchased to regulate an inefficient item, emissions will be reduced.

A few examples of reductions:

❍ Conversion of the municipal fleet to the most fuel-efficient vehicle for the intended use will cut down on gasoline prices and greenhouse gas emissions. A comparison of a typical SUV replaced by a compact or hybrid vehicle (based on 15,000 miles driven/yr) shows that:

- a 6 cylinder 2003 Toyota 4Runner SUV gets 17mpg city and 21 mpg highway and emits 10.1 tons of CO_2 per year;
- a 4 cylinder 2003 Toyota Corolla with automatic transmission gets 29 mpg city and 38 mpg highway and emits 5.9 tons of CO_2 per year;
- a 2003 Toyota Prius hybrid gasoline/electric vehicle gets 52 mpg city and 45 mpg highway and emits 4.0 tons of CO_2 per year.

❍ Vending machines that use electricity for refrigeration and lighting often run for 24 hours, 7 days a week, even in buildings that are occupied only five days per week during office hours. Control systems such as VendingMisers™† for vending machines and occupancy sensors for lighting will result in immediate emissions reductions and decreased energy costs. Comparison of an uncontrolled vending machine with an identical vending machine controlled with a VendingMiser (estimated from consumption of one machine over an average week) revealed the following:

- an average vending machine at Tufts University uses approximately 3,468 kWh per year for yearly CO_2 emissions of 2.7 tons [***See conversion units box***].
- the same vending machine equipped with a VendingMiser (initial cost $165) uses approximately 1,716 kWh per year for yearly CO_2 emissions of 1.3 tons.

❍ One incandescent exit sign converted to one LED exit sign:

- traditional exit signs use 24-40 watts per surface over a lifespan of 2-8 months for the bulbs; CO_2 emissions from these signs

Purchasing electric/gas hybrid cars—such as this Somerville resident's Honda Insight—for use in the municipal fleet, could save the City thousands of dollars each year in fuel costs, while reducing greenhouse gas emissions to less than half the amount produced by an internal combustion engine.

† A VendingMiser™ is a type of occupancy sensor that powers down the vending machine when there is low traffic around the machine. The VendingMiser does not change the quallity of the vended product.

can be as much as 530 pounds CO_2 per year.

- LED exit signs use 1-5 watts per surface over a lifespan of over 10 years; CO_2 emissions from these signs are only at most 107 pounds CO_2 per year.

❍ One incandescent light bulb switched to one compact fluorescent light bulb (CFL):†

- 100-watt incandescent bulbs use 1,000 kWh over 10,000 hours; CO_2 emissions will be approximately 1,530 lbs/ 10,000 hours;
- an equivalent CFL is 27 watts and will use 270 kWh over 10,000 hrs; CO_2 emissions will be approximately 413 lbs/ 10,000 hours.

Reason for recommendation

The City of Somerville, which has made a strong commitment to increasing energy efficiency and encouraging environmentally sustainable practices, has control over procurement of a variety of energy consuming items. A green procurement policy makes the City's support of environmentally sustainable practices explicit by requiring that every municipal purchase be made with energy efficiency in mind. This recommendation benefits the Somerville community not only because of the overall impact on the environment but also because of the cost savings over time. The lifecycle cost (i.e., total cost of an item over the time period of its use) of an efficient item will be less than that of a less efficient item.

Person or agency to implement recommendation

The Mayor, the Board of Aldermen, the City's Purchasing Director, the Buildings and Public Works departments and other municipal agencies and employees will all have various levels of responsibility for implementing a green procurement policy.

Implementation steps

Conversion of exit signs to LEDs and indoor lighting to CFLs: Determine the number of fixtures in each category and the costs of replacement bulbs and labor; establish a schedule for completing the replacement process.

Installation of VendingMisers: complete an inventory of vending machines; review information on installation pitfalls from Tufts Climate Initiative; order the VendingMisers for each machine and install the devices.

Installation of occupancy sensors: Evaluate lighting for appropriateness of occupancy sensors and install as needed.

Appliance upgrades: Complete an inventory of municipal appliances and replace them with Energy Star appliances as items are phased out of service.

Fleet conversion: Complete an inventory of the municipal fleet and replace outdated vehicles with most the most efficient alternative. Commitment to energy efficiency within the city fleet should also include transportation contracts. Evaluate contracts such as those with school bus companies to ensure that they also have a fuel-efficient fleet.

Budget/cost implications

The City will reduce operating expenses for the municipal fleet through gasoline cost savings for smaller vehicles or hybrids. The cost of new LED signs and CFLs should be recovered over a 2-3-year period, while the use of control systems and more energy-efficient appliances will lead to significant savings in even shorter timeframes. (***See examples.***)

Sources of funds

City budget (life-cycle costs for energy-efficient items will be cheaper and cost the city less money over time); utility partners for some of the energy efficiency conversions (in the past, NSTAR has collaborated on energy efficiency upgrades and is a willing partner for future projects).

†Types of lamp should be chosen based on shape, light output, configuration as well as your needs for power quality, color quality and room temperature.

Green Procurement Can Save Energy and Reduce Emissions: Some Examples

Electric signage—10-year lifecycle costs (purchase, energy expenditure, maintenance):

Standard sign	$380
LED sign	$65

Compact fluorescent lights (CFLs last as long as 8 incandescent bulbs, or 7 years):

Cost of new bulb	$5
Average savings (energy/replacement costs) per bulb lifetime	$46

Control systems:

Cost of VendingMiser™	$165
Savings in yearly electricity cost for average vending machine ($0.11/kWh)	$192

Is That SUV Really Necessary?

Some examples of average annual fuel costs:

2003 Toyota 4Runner, 6 cylinder	$1,223
2003 Toyota Corolla, automatic	$728
2003 Toyota Prius, gasoline/ electric hybrid	$484

Overcoming potential obstacles

The upfront costs of purchasing the most energy efficient item for the intended use may be higher in some situations. This may be a difficult concept to accept during tight budget times. The items outlined above as potential items for green procurement will have lower lifecycle costs than their less efficient counterparts. Educating government officials as to the cost savings and environmental benefit will be instrumental for success. Promotion of this policy by the Mayor and the Purchasing Director as well as communication to all department heads as to the adoption of a new purchasing policy are also essential for success.

Measures of success

Adoption of recommended procurement policy and implementation of energy efficient purchasing measures. The numbers of actual items purchased using this policy is also a measure of success.

References/Resources

1. ICLEI. Somerville Greenhouse Gas Emissions Inventory Report. September 2001.
2. Tufts University, Tufts Climate Initiative: www.tufts.edu/tie/tci; information on energy saving devices, www.tufts.edu/tie/tci/CO2reductions.html#Efficient; summary of potential pitfalls with VendingMisers, www.tufts.edu/tie/tci/VendingMisers.html
3. US Dept of Energy and US Dept of Environmental Protection: www.fueleconomy.gov; comparisons of fuel efficiency of various vehicles, www.fueleconomy.gov/feg/findacar.htm
4. Information on Energy Star products including computers: 208.254.22.6/index.cfm?c=home.index; 208.254.22.6/ index.cfm?c=computers.pr_computers
Natural Lighting.com; information on LED exit signs: www.naturallighting.com/exit_signs/exit_sign_repl_bulbs.cfm
5. LA Department of Water and Power (LADWP) ; information on energy efficient products including LED exit signs and CFLs: www.ladwp.com/energyadvisor/home.html; www.ladwp.com/energyadvisor/PA_1.html; www.ladwp.com/energyadvisor/PA_2.html
6. James Casey, Assistant Professor of Economics, Washington and Lee University; efficiency information on CFLs: home.wlu.edu/~caseyj/sustainable_development/JOHNC.html
7. www.greenseal.org/recommendations/CGR=CFLs.pdf
8. www.bayviewtech.com sells the VendingMiser™ and SnackMiser™.

Action Item 3
Appoint a Municipal Energy Manager

Goal and timeframe

Create the position of Energy Manager in the Department of Public Works to oversee and implement greenhouse gas emission reduction measures. An Energy Manager would monitor energy consumption within municipal government and would track greenhouse gas emissions for the City, implement reduction measures, and advise municipal officials regarding actions that would decrease the City's emissions. This is a high priority item due to the personnel hours and the coordination needed to meet the goals of cutting CO_2 to1990 levels by 2010 and to 10% below 1990 levels by 2015.

Projected greenhouse gas emissions reduction

A manager could facilitate emissions reductions on the order of 15,000 tons CO_2 by the year 2010, by helping to achieve a 10% per year reduction for seven years.

Reason for recommendation

An Energy Manager is considered a high priority because of the variety of overlapping-and sometimes inconsistent-policies and practices that cross departmental

lines, and the coordination required to reduce municipal greenhouse gas emissions. A staff person dedicated to looking for energy saving opportunities can also save the city money, often saving enough to offset the salary of the staff person.

The specific duties of the Energy Manager would include:

- ❍ Establishing an up-to-date, accurate emissions profile for the City and creating benchmarks for the City's emissions reduction goals;
- ❍ Completing a building inventory and cost benefit analysis for all municipal buildings with regard to energy efficiency, renewable energy, and water reduction measures;
- ❍ Working with the DPW and contractors to make sure that energy efficiency, renewable energy, and water reduction measures are implemented in municipal facilities and tested for their effectiveness;
- ❍ Tracking both the capital costs and life-cycle cost savings of efficiency upgrades and reporting these annually to the Mayor, the Board of Aldermen, and the Commission on Energy Use and Climate Change;
- ❍ Tracking transportation emissions and making specific recommendations to improve transportation utilized by city employees;
- ❍ Coordinating efforts among municipal departments to reduce emissions and maintaining awareness among the departments of projects that would significantly decrease municipal emissions;
- ❍ Assisting the City's Environmental Protection Officer with procurement of materials to improve upon the progressive purchasing policies currently in place;
- ❍ Keeping abreast of opportunities for alternative fuel vehicles, community transportation policies that will reduce greenhouse gas emissions, and congestion.
- ❍ Communicating and coordinating with other municipalities to strengthen the regional effects of energy efficiency.

Person or agency to implement recommendation

The Energy Manager would be appointed by the Mayor and the Board of Aldermen. The Commission recommends placing the position in the DPW and designating a person to whom the Energy Manager should report.

Implementation steps

1) Determine funding available for the position.
2) Create job description for energy manager with input from DPW personnel.
3) Hire Energy Manager and establish first-year priorities.
4) If funding for new position is unavailable, assign selected responsibilities within existing municipal infrastructure.

Budget/cost implications

Although many energy managers have demonstrated that the money they save on reduced energy costs more than compensate for their salaries, the City must front the money for salary before the benefits are realized. The upfront costs depend on how much staff time the City is willing to commit.

Sources of funds

City budget, utility funds, or grants.

Overcoming potential obstacles

Creating a new position during a time of budget austerity and painful cuts in other essential services may not be feasible at this time. Phasing the position in over time (e.g. starting quarter-time or half-time) would demonstrate that an Energy Manager would have a substantial positive impact on the budget. The Commission will prepare a cost/benefit analysis for the City to identify potential conservation measures that could offset the salary of an Energy Manager.

Success Story: Phoenix, Arizona

Phoenix began an energy management program in the late 1970s with no project funds the first year. The program developed slowly. At first, the city focused on projects with low costs, such as installing inexpensive controls on equipment in buildings. The city also carried out energy audits of more than 150 city facilities and, in 1978, hired a professional energy manager. The new manager quickly established credibility with the city council by documenting savings of more than $150,000 during the following year. In 1980, the city council invested $50,000 to carry out the recommendations of the city's energy audits. Funds from energy savings were left in the general fund account.

Then in 1984, the mayor and the city council established the Energy Conservation Savings Reinvestment Plan. Under this plan, the city reinvests 50% of all documented energy savings, up to a limit of $500,000, to finance

continued on next page

Success Story
(continued from previous page)

energy efficiency capital projects for the following year. Some "seed" money was provided in the early years of the plan. By 1986, energy savings exceeded $1 million per year and the fund reached its limit of $500,000, where it continues to the present.

The fund is used to help departments purchase new energy-conserving capital equipment. For example, if a department needs to buy new energy-consuming equipment, such as a chiller for air conditioning, the fund can pay for the difference between an energy-efficient model and a cheaper model that is less energy efficient.

Phoenix's experience with budget incentives can probably be repeated with other local governments. The first step is to develop accounting and energy planning and monitoring capabilities in house. With this in place, one can verify the results and take advantage of the long-term financial benefits of effective energy management.

Measures of success

A successful energy manager would be able to quantifiably reduce greenhouse gas emissions, save money for the City, and create a program of continued improvements to prevent and decrease future greenhouse gas emissions.

Reference

1. www.eere.energy.gov/cities_counties/energy.html

Action Item 4
Promote Use of Bicycles as Primary Vehicles

Goal and timeframe

The City should promote the use of bicycles as primary vehicles by commuters and residents and should implement education programs in schools and businesses to promote the safe use of bicycles and to raise awareness of the rights and responsibilities of cyclists in and around Somerville. These programs should include primers on state and city traffic laws as they apply to bicycles, in order to encourage cooperative relationships between drivers and cyclists in Somerville. In addition, programs should be instituted to more clearly mark Somerville city streets and bike lanes; to encourage synergistic use of bicycles and MBTA buses and trains; to raise awareness among individuals and business owners as to the needs of bicycle users in Somerville; to install bike racks and locking rings in heavy traffic areas of the city; and to revise zoning rules requiring that there be bicycle access to developed areas. Finally, Somerville should continue work on the planned bike path extension.

There are five distinct projects within this action item:

1. Bikepath extension
2. Community education programs
3. Installation of locking rings and bike racks in high traffic areas
4. Lining and maintenance of roads
5. Modification of city zoning rules to improve bicycle access

Projected greenhouse gas emissions reduction

The average 2003 family sedan emits 6-12 tons of greenhouse gas per year, according to the EPA's website (www.fueleconomy.gov). While it is difficult to make a precise estimate of greenhouse gas reductions related to bicycle use, it is self-evident that the use of bicycles and public transportation rather than personal motorized vehicles reduces the number of miles driven or, in some cases, completely eliminates those vehicles from the roads, thereby reducing the amount of fossil fuel burned for transportation purposes.

Reason for recommendation

Automobiles produce a significant portion of the total amount of greenhouse gas emissions. Thus, any measures that can be taken to reduce the usage of automobiles will have a direct impact on improving the environment. Bicycling is an excellent alternative to the automobile for short trips. The intent of this action item is to encourage the use of bicycling within Somerville, which will reduce emissions, thereby reducing contributions to climate change, and will also have secondary benefits as well.

A reduction in vehicle use would reduce wear and tear on infrastructure, would save individual automobile owners money on the maintenance of vehicles, and would reduce pollution related to the operation and maintenance of those vehicles. Furthermore, encouraging responsible use of bicycles will promote healthier lifestyle choices, and may encourage the average citizen to take a greater interest in maintaining and expanding the city's parks and open spaces.

Similarly, increased foot and bike traffic may lead individual citizens to hold a greater interest in their community, and the comfort and safety of themselves, their families and their neighbors. Increased community involvement can only lead to a better quality of life for people in Somerville.

Person or agency to implement recommendation

This varies from project to project.

Bikepath extension: The Somerville Bike Committee (SBC) is already working on a number of recommendations to increase the utility of the planned bike path extension, as well as the current length of the path.

Community education programs: The Somerville Police Department currently has an education program in place in schools. Officer Jim Hodgedon is the individual in charge of this program, and could be expected to oversee an expansion and diversification of education programs for adults and children in Somerville.

Installation of locking rings and bike racks; lining and maintenance of roads: Todd Blake of the Somerville Department of Public Works is DPW's point person for the marking of roads and the installation of locking rings and bike racks around Somerville.

Modification of city zoning rules to improve bicycle access: Stuart O'Brien of OHCD has developed new zoning guidelines for the city of Somerville that include revised rules for businesses regarding accommodations for cyclists based on the number of parking spaces made available by businesses. These guidelines, however, have not yet been explicitly incorporated into the City's zoning ordinance.

Implementation steps

Bikepath extension: The Somerville Bike Committee has already done a good deal of excellent work on the Somerville Community Path extension. The Commission can best serve this goal by offering its active and vocal support to the actions of the SBC.

Community education programs: Expand current education programs in schools. Develop educational materials for distribution to adult Somerville motorists and cyclists. These materials could take the form of literature handed out to motorists seeking Somerville resident parking stickers, signs posted near locking rings with friendly reminders as to the rights and responsibilities of cyclists and drivers, etc. Somerville Police officers should be encouraged to cite or warn cyclists and drivers for otherwise minor traffic violations that could cause serious safety issues; included with the warning could be literature explaining the necessities of a safe relationship between motorists and cyclists.

Installation of locking rings and bike racks: Expand and continue Somerville's currently ongoing plan to install locking rings in high traffic areas through the DPW. Encourage business owners, through the educational program and possibly subsidies, to install bicycle racks at their businesses. Officially adopt revised zoning laws requiring new businesses to provide a certain amount of bike parking based on how many automobile parking slots are provided. Finally, consistent guidelines for the type, appearance and maintenance of bike racks (both those operated by individual businesses, and those operated by the city) should be created to maintain a consistent and orderly appearance throughout the city.

Lining and maintenance of roads:Create specific city guidelines for the consistent, safe, and clear marking of roads and bike lanes in Somerville. Ensure that the DPW maintains road markings as well as possible. If possible, bike lanes on one-way streets should be placed on the left side of the road to place cyclists more fully in the view of the drivers of vehicles. Towards this goal, Somerville should be encouraged to increase the Department of Public Work's budget and manpower in this area (i.e. we want to make sure that the increased budget goes towards bicycle related issues).

Modification of city zoning rules: Officially adopt new zoning rules developed by Stuart O'Brien into City of Somerville zoning laws.

A Chicago Success Story

Since Mayor Richard Daley of Chicago formed the Mayor's Bicycle Advisory Council in 1991, Chicago has striped more than 100 miles of bikeways in the city, installed more than 5,000 bike racks, and created a friendly and safe environment in the city of more than one million residents. Daley's focus on making Chicago a bike-friendly city through education, enforcement, the installation of facilities for cyclists and the institution of bike friendly programs has led the League of American Bicyclists and Bicycling Magazine to declare Chicago to be the best American city in which to ride in both 2001 and 2002.

Budget/cost implications of action item

There are few additional cost implications beyond commitments already made by the City to the Somerville Community Path extension. There may be some budget impacts for literature production and installation of signs in high traffic areas and near bike racks. Subsidies may be required to encourage business owners to install bike parking in or near their businesses above and beyond those that are already scheduled to be installed by the city. Marking City roads and keeping lane stripes properly maintained will require an increased budget and greater manpower than Somerville currently has available.

Sources of funds

Fines for creating potential traffic hazards could generate additional funds for the City, some of which could be used for production and distribution of bike-relaterd educational materials. Grant funding for primary education programs could be pursued. Small tax rebates could be given to businesses that install bike parking. An increased budget for road maintenance is unlikely at this time, but the city is encouraged to ensure that bike safety is treated as a priority within the existing budget.

Overcoming potential obstacles

A limited city budget could be compensated for, at least to a certain extent, by state or federal funds available for implementing environmental or community improvement projects. Public perceptions and attitudes need to change in order to help cyclists feel safer when they commute to and from work.

Outreach required

The CEUCC should work with the Somerville Bike Committee to educate the public about the Community Path extension, the development of a “Safe Routes to School” program, and ongoing work to develop more bike friendly roads in and around Somerville. The Somerville Police Department should be encouraged to reinstate bike patrols as soon as possible, and empower its officers to issue violations to cyclists and motorists for traffic infractions. Education programs should be implemented for both cyclists and motorists, to reduce confrontational interactions between the two groups.

Measures of success

Any increase in the use of bikes, especially if accompanied by a reduction in motor vehicle traffic within Somerville, could be seen as a successful outcome to any or all of these programs. Likewise, a reduction in the number of accidents involving bicycles, the increasing synergistic use of bikes and public transportation, and more conscientious maintenance of roads and public ways for use by cars and bikes are valid measures of success.

References/Resources

1. Turil Cronburg, Chair of the Somerville Bike Committee: bc@ci.somerville.ma.us
2. Stuart O’Brien. Somerville OHCD: (617) 625-6600
3. Todd Blake, Somerville Department of Public Works: (617) 625-6600, or tblake@ci.somerville.ca.us
4. The MassBike website: www.massbike.org
5. Emissions and greenhouse gas information: www.fueleconomy.gov

Policies that make bicycling easier and safer for commuters and recreational cyclists can reduce automobile use and promote healthier lifestyle choices.

Action Item 5
Evaluate Options for Purchasing Municipal Green Power

Goal and timeframe

The City should undertake an annual review of the feasibility and available options for green power† purchasing as this relatively new and evolving part of the energy market takes a clearer shape. As it becomes feasible, the City will be encouraged to purchase green power to meet at least a portion of its electricity needs.

Projected greenhouse gas emissions reduction

For every kilowatt hour of emission-free green power that is purchased, the City would offset 1.53 pounds of CO_2. By purchasing green power to meet 10% of the City's electricity load, for example, the city would reduce CO_2 emissions by about 1,100 tons each year.

Reason for recommendation

Conventional electricity use and production in Massachusetts has a high impact on climate change. Roughly one third of all CO_2 emissions are produced as a byproduct of electricity generation. Efficiency measures are important, as they will reduce the City's use of electricity. City support of clean, renewable sources of electricity, however, is equally important. By purchasing green power, the City will send signals to the market that a healthier, cleaner, future-friendly power source is of higher value than those that pollute our environment. The purchase of green power can be easily marketed to display the City's commitment to renewable energy, to decreasing dependence on fossil fuels, to supporting a local economy, and to a healthier environment. This is also a way for the City to set an example that residents can follow.† †

Person or agency to implement recommendation

To purchase green power is a policy decision to be made by the Mayor and the Board of Alderman. Once a decision has been made, the Commission will assist the Superintendent of Lights and Lines in the practicalities of purchasing green power.

Implementation steps

At this point in time, the green power market is still developing in response to electricity restructuring in 1997. The Commission suggests that the City annually evaluate the options for purchasing green power for a set amount of its electricity use. That evaluation should include:

a. forms in which green power is being sold;
b. the suppliers providing green power options;
c. sources from which the power is coming; and
d. the cost of the various green power options relative to undifferentiated power.

In the upcoming months and years green power is likely to be sold in any of the following three ways:

1. a delivered product in which the City would switch the supply portion of their electric bill to a competitive supplier of energy (listed as a line item on the NSTAR bill),

Clean, renewable wind power could be an important part of New England's energy future, making a green power option feasible for the City of Somerville.

† According to Tim Woolf of Synapse Energy Economics, the term green power "typically refers to electricity generation that is more environmentally benign than undifferentiated power or the average power on the market." Electricity generated from some significant percentage of renewable sources, including wind and solar technologies, is generally considered "green power," though experts do not completely agree on the percentages required or on the complete list of "renewables" that qualify as "green."

†† Although nuclear power generation is greenhouse-gas-emission free, the Commission does not recognize it as a clean power alternative, because of the burden of radioactive waste and other public safety and security dangers inherent in nuclear power production.

Green Power Success Stories

Santa Monica, California became the first city in the nation to commit to purchasing 100% of its electricity from renewable energy resources in 1999. The city contracted with the energy provider for the municipality's entire electric load, including the Santa Monica airport—a total of 5 MW. The premium for the purchase is equivalent to a 5% increase on the city's electric bills, equivalent to an extra $140,000 a year. The power will be mainly from geothermal resources, although solar and wind will also be in the mix.

In January, 2002 the Town of Westport, Connecticut became the first municipality in the Northeast to purchase green power for part of its municipal load. The Board of Selectmen voted to purchase the Connecticut Energy Cooperative's EcoWatt product, a 100% renewable electricity blend consisting of 65% hydro, 29% landfill gas, and 6% wind. EcoWatt power is used in Westport's Town Hall as well as most of its recreation buildings. The premium for the EcoWatt offering is equivalent to an extra 25-30 cents a day for the average household.

The City of Newton is purchasing wind power certificates to offset 20% of the power used in City Hall for one year.

2. a "green pricing" option, in which the City would be able to select to pay a premium on their NSTAR bill for the purchase of energy as well as renewable energy certificates (RECs) to account for a set amount of their electric use, and
3. a "certificate" option in which the customer's electric bill from NSTAR will not be affected, and RECs are purchased in addition to the electric bill from a separate green power marketer.

In all cases, the City would ultimately be buying two things: energy and RECs to represent the "non-energy attributes" associated with renewable energy production. Each REC offsets power being put into the New England power grid from dirtier sources such as coal, oil, gas, and nuclear power.

As of May 2003, the only form of green power purchasing available to the City (aside from installing its own renewable energy generating facilities) is the option of purchasing certificate products such as ReGen from Sun Power Electric and New England Wind from the Massachusetts Energy Consumers Alliance. By the end of 2003, NSTAR is likely to be offering its customers a green pricing option on their bills, although the makeup of this green product is yet unknown.

We recommend that in the first year, the City should aim to purchase renewable energy certificates to match 1% of municipal electricity use from Green Power. If a green pricing option becomes available through NSTAR, we suggest the city switch one meter to this supply source in the first year.

Budget/cost implications

Green power is estimated to cost $.03 per kilowatt-hour more than conventional electricity at this time.

Sources of funds

City budget for facility operations. Funds saved through efficiency or as a result of measures implemented by an Energy Manager, could be put toward the purchase of higher cost green electricity.

Overcoming potential obstacles

Obstacles include the higher cost of clean electricity, and the complexity of the green power market and the changing options.

Outreach required

The Commission should work with various facilities and departments to determine which building's meters should be switched to green power, or what loads should be offset with certificates to gain the most benefit in terms of educational value to the community.

Measures of success

The most important measure is the percentage of the City's power coming from non-polluting sources such as wind and solar. Ideally, as costs and availability of green power products in the future make such a goal achievable, the City would purchase green power for its entire electrical load.

References/Resources

The Massachusetts Technology Collaborative's Renewable Energy Trust has awarded grants to groups for the aggregation of clean power purchasers. The Health and Education Facilities Authority (HEFA) is the furthest along in working to offer clean power to institutions using large amounts of electricity.

The Massachusetts Energy Consumers Alliance plans to offer a clean power product to utilities interested in offering consumers a green pricing option. At this point, it is unclear whether NSTAR will be offering green pricing to their customers within the next couple of years. In the meantime, and to customers who are not able to purchase green power through their distribution company, Mass Energy is offering a certificate product comprising renewable energy certificates from local wind developments. www.newenglandwind.org.

Sun Power Electric currently offers a certificate product called ReGen, comprising landfill gas and solar energy. Although this option is preferable to doing nothing, landfill gas does not meet zero-emission criteria used above in calculating CO_2 offsets.

Green-e is a program for certifying retail electricity products as "green power," based upon environmental standards that are approved by a national board using input from regional advisory committees. The purpose of the green-e standard is to provide customers with a simple, widely accepted seal of approval to identify environmentally preferable power offerings. For more information, see www.green-e.org.

Additional Municipal Recommendations

Encourage Green Building Practices for all Municipal Building Renovation and Construction

Green building practices have dual benefits of improving the environment while saving money. These techniques include implementation of energy-efficient equipment and building strategies, examination of air and water quality, and the use of environmentally responsible building materials. The City has many old municipal buildings that will undoubtedly require renovation in the future. When a building is selected for renovation, the City should ensure that the project managers thoroughly examine the potential application of green building practices. Action Item 9 in this Plan discusses methods to promote green building techniques in commercial and industrial construction and renovation. All builders, for example, can be required to fill out a Leadership in Energy and Environmental Design (LEED) scoresheet, which is a measure of a building's "greenness." The City should require that all project managers working on municipal building renovation complete LEED scoresheets and work closely with the project managers to ensure implementation of green building strategies. Green building-related energy-efficiency measures at the Capuano school are already improving the environment while saving money. Future projects, such as the Homans building that will act as a City Hall Annex, could greatly benefit from green building techniques and the municipal operating costs for these buildings will be much lower than costs associated with typical buildings.

Enforce the Statewide Anti-Idling Law Effectively

Massachusetts has enacted an anti-idling law that prohibits the idling of any vehicle for longer than five minutes. This applies to any vehicle unless the vehicle: a) is being serviced and running the engine is required for the vehicle's repair; b) is engaged in delivering goods where engine-assisted power is necessary; or c) is engaged in an operation for which associate power is needed provided that this action does not cause air pollution.

Exhaust from idling vehicles not only generates unnecessary carbon dioxide and particulate matter, it adversely impacts the 20% of the population who suffer from asthma or other allergies.† By limiting idling time of school buses, taxis, and delivery vehicles, Somerville can reduce its greenhouse gas emissions while directly improving community health.

Promote Green Space

Somerville is one of the most densely populated cities in Massachusetts. Preservation of existing green space is necessary to promote and protect public health and the general quality of life in the city. In addition, community trees are an important natural resource that provide many environmental benefits. Trees absorb carbon dioxide, purify air through transpiration, retard the rate of water

The Anti-Idling Law

Chapter 90, Section 16A, Stopped Motor Vehicles

No person shall cause, suffer, allow or permit the unnecessary operation of the engine of a motor vehicle while said vehicle is stopped for a foreseeable period of time in excess of five minutes. The section shall not apply to (a) vehicles being serviced, provided that operation of the engine is essential to the proper repair thereof, or (b) vehicles engaged in the delivery or acceptance of goods, wares, or merchandise for which engine assisted power is necessary and substitute alternate means cannot be made available or (c) vehicles engaged in an operation for which the engine power is necessary for an associate power need other than movement and substitute alternate power means cannot be made available provided that such operation does not cause or contribute to a condition of air pollution.

Whoever violates any provision of this section shall be punished by a fine of not more than one hundred dollars for the first offense, nor more than five hundred dollars for each succeeding offense.

† ***Asthma & Allergy Bulletin***. Vol. 15, No. 3 (Fall, 1996) published by Asthma & Allergy Foundation of America/New England Chapter.

runoff, and provide cooling through shade, minimizing the heat island effect. The Commission supports the recommendations of the Somerville Open Space Plan to establish a tree committee to survey and protect trees, to adopt a “no net loss” policy for City owned open space parcels, to expand the City’s supply of open space parcels through outright purchase or public-private partnerships, and to expand the existing “adopt a spot” program in the City.

Support Public Transportation

Accessible and reliable public transportation is an important resource to help minimize greenhouse gas emissions from personal vehicle use. The Commission encourages the City to continue its support the MBTA Urban Ring transit route, an MBTA Orange Line stop at Assembly Square, and extension of the Green Line through Union Square. Additional subway transportation to this area will reduce Somerville residents’ dependence on cars and taxis, reducing the overall emissions of greenhouse gases.

Create an Award Program for Municipal Employees

The Commission recommends establishing an award program for municipal employees who make suggestions that significantly promote energy efficiency and energy cost savings and that minimize the municipality’s impact on climate change. Award recipients would be recognized with a certificate from the city and would accrue an additional vacation day.

Section II

Residential Opportunities and Recommendations

Introduction

According to the 2001 ICLEI inventory, residential energy consumption (based on 1997 data) is the largest contributor to greenhouse gas emissions in Somerville. Almost half (46%) of the City's energy is used in the 32,000 residential units. An estimated 30% of the residential energy consumption was in electricity use, and the rest was from home heating. Addressing greenhouse gas emissions in Somerville will require educating householders about the many opportunities they have to reduce energy consumption.

Americans on the whole have lifestyles that waste energy needlessly because energy prices have been relatively low. During the "energy crisis" of the 1970s there was a surge in interest in energy saving practices, but that interest faded with the easing of the crisis. Now that electric, gas, and home heating prices are rising again, residents may be more receptive to energy efficiency messages. Saving money, however, is not the only thing that influences people to change habits. Strategies aimed at the residential energy consumer must take into account the "psychology" of behavior change in order to be effective.

Somerville's residential sector is made up of various groups: homeowners, tenants, and students, living in single-family houses, large apartment buildings, and facilities for the elderly. An effective plan to reduce residential energy consumption must address the specific needs of these different groups.

Of the changes residents can make in their lives to save energy, many will also save money without compromising comfort or convenience. In fact, weather stripping around doors and windows can reduce draftiness in the winter and actually make a living space more comfortable while saving energy. A major task of the Commission and SCA will be to promote awareness of these simple strategies.

Action Item 6
Launch and Promote the "Somerville Sees the Light" Campaign

Goal and timeframe

The goal of "Somerville Sees the Light" is to convert the equivalent of one incandescent bulb per household to an energy-efficient compact florescent lightbulb (CFL) within one year. Somerville Climate Action will undertake a widespread media campaign to educate Somerville residents about CFLs, to promote their availability in the community, and to promote their use .

Projected greenhouse gas emissions reduction

Assuming one bulb per household in Somerville is changed to a CFL: 64 lbs CO_2/year/bulb x 32,000 households = approximately 1,000 tons CO_2/year saved.

Reasons for recommendation

As members of the community are made more aware of the crisis of climate change and the need to conserve energy, we believe they will make significant changes to their homes and lifestyles, reducing emissions accordingly. Behavior change, however, is a slow process that is sometimes difficult to bring about even in the face of compelling need. Converting one incandescent light bulb to an energy efficient CFL is an easy task to accomplish with a small initial financial investment. This makes it a more realistic first step than an expensive change, such as insulation or buying new energy-efficient appliances. Both the monetary and emissions savings can be dramatic, demonstrating to residents how energy efficiency is actually cost effective. This could be a great tool for bringing about future behavior changes on a larger scale. By starting with this achievable goal,—one bulb changed by each household—this campaign could create a significant reduction in residential greenhouse gas emissions, making a substantial contribution toward the City's overall 10% reduction goal.

A large-scale media campaign, as proposed here, could bring the message of residential energy efficiency to many Somerville residents. The campaign provides an opportunity to partner with local retailers and businesses, increasing awareness of energy-efficient lighting in the commercial sector as well. "See the Light" or similar campaigns are currently being initiated in Medford, Salem, and Brookline. Other neighboring communities, including Arlington and Cambridge, may also start campaigns, making this a regional climate protection action. This is an opportunity for Somerville to keep in step with its neighbors and be part of a regional campaign. The advantages of joining forces with other cities and towns include pooling resources and making combined appeals to funding sources for grants (which would increase the chances of success).

Person or agency to implement recommendations

Members of CEUCC and/or SCA.

Implementation steps

- ❍ Design and produce outreach materials for Somerville, coordinating with Medford and Salem, including fliers, point-of-purchase displays, posters, bumper stickers.
- ❍ Research funding sources and write grant proposals.
- ❍ Seek endorsement of Mayor and Board of Alderman, including commitment from each to install at least one CFL in their own homes and kick off campaign during Somerville Cleanup Day on May 17, 2003.
- ❍ Get press coverage; write an article for the Somerville Journal, submit press release to Sunday Globe City Weekly section, arrange for public service announcements on cable access television (SCAT) and WMFO (Tufts University radio).
- ❍ Have outreach table at ArtBeat, July 19, 2003. Make CFL float for ArtBeat parade.
- ❍ Translate brochure into Spanish and Portuguese and find spokespersons from these communities willing to speak on the issue and distribute information.
- ❍ Work through affinity groups such as churches, schools, community gardens, friends of the library, rotary club, lions, chamber of commerce, etc. as well as other community groups that could put notices in their newsletters or set up speaking engagements.
- ❍ Work with realtors on welcome package for new Somerville residents.
- ❍ Approach landlords of large apartment buildings, the Somerville Housing Authority and tenants unions.
- ❍ Evaluate program spring 2004.

Compact fluorescent bulbs (CFLs) use a fraction of the electricity needed by incandescent bulbs, while providing comparable illumination. If every Somerville household replaced just one incandescent bulb with a CFL, the City's greenhouse gas emissions would be reduced by more than 1,000 tons per year.

Budget/cost implications

Approximately $500 for brochures, posters, and educational items for ArtBeat.

Sources of funds

- ❍ North Eastern Grassroots Environmental Foundation (NEGEF). $2,000 was awarded as the result of a joint proposal with Medford submitted in Spring 2003;
- ❍ NSTAR energy efficiency community outreach fund;
- ❍ Other potential funding sources may include: manufacturers of CFLs, local business sponsors, and national businesses with local stores that sell light bulbs, including Home Depot, Target, and K-mart.

Overcoming potential obstacles

- ❍ Resistance to the perceived high cost of the bulbs. We will promote the long-term cost savings due to their energy efficiency.
- ❍ Insufficient education about the use of the bulbs, particularly regarding which bulbs are compatible with which fixtures. We will distribute catalogs that show the various types of bulbs and fixtures in which they fit.
- ❍ Dissatisfactions with the color/quality of the light or look of the bulbs. Our outreach will include information on improved bulb quality and we will have some samples with a light strip at ArtBeat so people can see a side-by-side comparison.
- ❍ The psychological difficulty of breaking out of long-term habits. As more people start using them, we anticipate that CFLs will feel like the normal thing to purchase.

Measures of success

We will try to integrate extra questions for the Somerville and Medford zip-codes into a statewide survey being conducted by the major utilities to assess the effectiveness of their CFL promotion. If that is not possible, we will develop simple questions for a random survey of pedestrians in shopping areas around the city.

References/resources

1. Energy Star “Change a Light, Change the World”: www.energystar.gov/index.cfm?c=cfls.pr_cfls
2. First Unitarian Church of Portland, OR (1-2-3 Response)
3. Northwest Energy Alliance: www.nwalliance.org/projects/projectdetail.asp?PID=38.
4. www.fes.uwaterloo.ca/research/REEP

Action Item 7
Initiate a Green Sanctuary Program

Goal and timeframe

To make houses of worship more energy efficient, both by reducing greenhouse gas emissions from the buildings in which congregations meet and by encouraging congregants to take energy efficiency measures in their own homes.

- ❍ Short-term goal: One congregation to sign up for the Interfaith Power and Light (IP&L) program in 2003.
- ❍ Medium-term goal: 20% of congregations in Somerville (approximately six) to sign up for the program by 2007.
- ❍ Long-term goal: 10% of congregants in each participating congregation to commit to energy efficiency measures at home by 2007.

Green Sanctuary Success Stories

All Saints Episcopal Church, Brookline, MA and Trinity Church, Canton, MA have both participated in the Interfaith Power and Light program. They are both making significant reductions in greenhouse gas emissions and saving money. See the Interfaith Power and Light website (www.mipandl.org) under case studies to read about their successes.

Projected greenhouse gas emissions reduction

All Saints Church Episcopal Church in Brookline documented the following greenhouse gas emission reductions: By purchasing 100% renewable electricity the parish is reducing CO_2 emissions by more than 50 tons, and through installation of a high efficiency boiler and storm windows, they are reducing CO_2 emissions by 47 tons.

Reasons for recommendation

The Green Sanctuary Movement is taking hold in various communities around the country. More than in the municipal and commercial sectors, reducing greenhouse gas emissions in the residential sector involves encouraging people to voluntarily make changes in their lifestyle and behavior. Research indicates that people are more apt to make behavior changes in the context of an affinity group. Religious congregations are strong affinity groups which not only provide social support networks for encouraging personal behavior change, but also a context for equating moral and ethical beliefs with action to protect the environment. In addition, the buildings in which religious groups meet tend to be large and are often designed with priorities other than energy efficiency (i.e. high ceilings to promote a spiritual atmosphere). Taking energy efficiency measures in these buildings may reduce greenhouse gas emissions significantly. An active Massachusetts organization, Interfaith Power and Light, is available to partner with the city and to provide substantial assistance in implementing a Green Sanctuary Program.

Person or agency to implement recommendations

IP&L will implement this program in conjunction with members of the Commission and/or Somerville Climate Action. Endorsement by the Mayor's office would be beneficial.

Implementation steps

- ❍ The program can be initiated with a meeting between heads of houses of worship (religious leaders, social action committees, presidents of congregations, etc.) and Interfaith Power & Light, along with members of the CEUCC or SCA. This has worked well in other communities.
- ❍ At the meeting, congregations will sign up with IP&L, or make expressions of interest in the program.
- ❍ IP&L will make follow up contacts.
- ❍ The Conservation Services Group (CSG) will conduct energy audits of houses of worship participating in the program.
- ❍ Congregations will follow through with recommended renovations.
- ❍ Congregations will measure energy savings-both financial savings and greenhouse gas emissions reductions.
- ❍ A followup campaign will be undertaken with members of the congregation; for example, congregation leaders will be provided with information on energy efficiency programs.
- ❍ Participating houses of worship will receive public recognition (i.e. green seal, certificate or plaque from the mayor, press releases, etc.).
- ❍ Other congregations will be encouraged to join the program.

Budget/cost implications

Minimal costs will be incurred by the city, including photocopying, mailing, making plaques of recognition. The costs for renovations will be borne by the houses of worship themselves and will vary according to each audit. Recommendations made by CSG generally have a seven-year payback.

Source of funds

Funding may be covered by energy efficiency funds managed by NSTAR.

Overcoming potential obstacles

- ❍ The cost of renovations may be daunting for congregations, with payback periods longer than they can manage. Emphasizing the long term financial savings may encourage them to find financing for renovations.
- ❍ The priorities of congregations and their leaders are difficult to predict. The promise of public recognition may instill a slight competitive spirit among congregations, encouraging them to participate.

Measures of success

- ❍ The number of houses of worship that participate in the program; how many make renovations; and the number of congregants who make pledges and take action in their own homes.
- ❍ Over time, energy savings can be recorded by participants and reported back to IP&L and CEUCC.

References/resources

1. Interfaith Power and Light, newsletter and website: www.mipandl.org.
2. Coalition on the Environment and Jewish Life (COEJL): www.coejl.org.

Additional Residential Recommendations

Promote home insulation

Home heating consumes more energy than any other activity in the residential sector. Insulating a home can save up to 30% of the energy consumed for heating and air conditioning. Many homeowners are not aware of the cost effectiveness of home insulation and do not know that there are rebates available from NSTAR for many types of home insulation. The Commission could perform a valuable outreach function by educating Somerville residents about the issue and distribute information about utility-sponsored rebate programs.

Outreach to first-time home-buyer programs

The Office of Housing and Community Development sponsors courses for first-time home buyers and has agreed to allow the Commission to address the participants about home insulation and energy conservation. An outline of the presentation has already been accepted by OHCD for the next course. If the presentation is successful, the Commission may try to address other groups of first-time home-buyers, as well as realtors, who could highlight the value of insulated homes to potential buyers.

Promote walk to school programs

“Shape up Somerville” is a three-year project through the Tufts University School of Nutrition aimed at helping Somerville parents and children learn strategies to avoid obesity and its associated health risks. The Tufts team will look for ways to create safe walking routes to the city's 10 elementary schools to increase students' daily physical activity. The Commission supports this and other activities that train young people to use their own power rather than relying on cars for transportation.

Promote tree planting and maintenance

When the majority of the urban surface area is covered by heat-absorbing buildings, concrete and roads, the result is the “heat island effect”—higher temperatures experienced in urban areas compared with surrounding suburbs. Trees and plants are a counterbalance to the heat island effect. Groundwork Somerville's mission is to build a sustainable community through teaching skills, such as tree planting and maintenance, to residents who will then create healthy neighborhoods. The Commission supports Groundwork Somerville in activities that add shade trees and other plant life to the City.

Home insulation ordinance

An ordinance passed by the city of Berkeley, California requires that specific insulation be installed in homes at the time of property transfer or if renovations greater than $50,000 are undertaken. An ordinance of this nature could be a great tool to reduce greenhouse gas emissions, though it is not feasible for Somerville at this time due to lack of inspectors to enforce it. The Commission would like to keep this tool in mind as education about the importance of insulation and rising home heating costs may combine to make this type of ordinance viable in the future.

Section III

Commercial and Industrial Opportunities and Recommendations

Introduction

Improving energy efficiency in Somerville's commercial and industrial establishments can lead to significant improvements in greenhouse gas levels for the city as a whole.

According to the ICLEI Emissions Inventory Report, Somerville's commercial sector is responsible for approximately 221,339 tons of CO_2 per year, or approximately 30% of all emissions in the City. Electricity use at the approximately 2,342 commercial and industrial establishments in the City of Somerville comprises 69% of the commercial emissions tonnage, or approximately 152,723 tons of CO_2 per year. This electricity usage accounts for 21% of all community emissions. These figures underscore that a reduction in commercial and industrial energy consumption can have a sizable impact on reductions for the entire community.

One method of achieving this goal is through the City's support for and promotion of energy efficiency in local businesses. A way in which this can be accomplished is through energy efficiency programs already set in place by local utilities. NSTAR promotes energy efficiency through free energy audits and programs that offer low-cost installation of energy efficiency upgrades to commercial lighting fixtures, electronic building controls, HVAC, and other mechanical equipment. Through a retrofit program targeted to small businesses (those with annual average monthly demand of less than 100 KW electricity) NSTAR will pay for up to 80% of total project costs; a retrofit program for larger businesses is also available, in which NSTAR will pay for up to 50% of total project costs.

NSTAR programs offer an excellent opportunity for businesses in the City, yet they must be viewed only as a first step. Energy efficiency, which is an effective cost-saving mechanism for businesses, should be promoted in the City regardless of utility support. The first action item in this section will describe how the City can work with businesses in the community to take advantage of existing programs to improve energy efficiency.

"Green building" techniques provide a second way to decrease commercial and industrial energy consumption. When a new building is under construction or an older building is being renovated, there are unique opportunities to incorporate energy-efficient designs and equipment. Green building practices are not only beneficial to the environment by reducing the community's emission levels, but they can often save a client money at the outset and decrease maintenance costs over the life of the building. The second action item in this section will describe efforts that should be undertaken to encourage the use of green building techniques in Somerville, as well as incentives that can be offered to designers and builders who use these techniques.

Action Item 8
Reduce Commercial CO_2 Emissions By Implementing Energy Efficiency Measures

Goal and timeframe

To foster communication between small commercial and industrial establishments and representatives from NSTAR and its installation contracting firm (Harris Energy) to increase participation in NSTAR's Small Commercial & Industrial Retrofit Program (also known as the "Small Business Services" program). At least 10% of Somerville small businesses will undertake some type of retrofit by 2010.

Projected greenhouse gas emissions reduction

According to the 2001 ICLEI Report, Somerville's commercial sector is responsible for approximately 221,300 tons of CO_2 per year. The report includes a projection for 2010 commercial emissions (216,864 tons), and if we assume a steady annual rate of decrease (0.157% decrease per year) from 1997 to 2010, we can estimate that 2003 commercial CO_2 emissions equal roughly 219,300 tons.

Each business will have different emissions reduction opportunities, and calculation of a complete reduction measure is thus nearly impossible.

Reason for recommendation

The City of Somerville should support and promote energy efficiency in local businesses. One way in which this can be accomplished is through energy efficiency programs already set in place by local utilities. NSTAR offers programs that promote energy efficiency, provide free energy audits, and offer low-cost installation of energy efficiency upgrades to commercial lighting fixtures, electronic building controls, HVAC, and other mechanical equipment. These programs include a Retrofit Program targeted to Small Businesses (those with annual average monthly demand of less than 100 KW electricity) in which NSTAR will pay for up to 80% of total project costs, and a Retrofit Program for larger businesses in which NSTAR will pay for up to 50% of total project costs.

NSTAR also offers programs for larger businesses focusing on particular energy consuming equipment (e.g., motors, air conditioning, compressed air systems, et al). For motors, qualifying commercial and industrial customers can purchase a NEMA premium qualifying motor for approximately the same cost as a standard EPAct efficiency motor through NSTAR's MotorUp program. Premium-efficiency motors will quickly save far more than the additional cost of the motor, continue saving energy and money throughout the life of the motor.

Based upon Fourth Quarter 2002 estimates from Dun & Bradstreet's iMarket database, there are 2,342 commercial and industrial establishments in the City of Somerville (***see Table 1***). Based on the estimates described above, commercial and industrial establishments are responsible for approximately 221,300 tons of CO_2 per year.† Electricity use at these facilities comprises 69% of the total emissions tonnage, or approximately 152,700 tons of CO_2 per year. As illustrated in Table 1, nearly three-quarters of the city's businesses have fewer than 5 employees. Thus, the majority of businesses in Somerville likely fall into the "small business" category.

Recent technological improvements have resulted in dramatic efficiency improvements for lighting and HVAC equipment that translate to lower CO_2 emissions. These new technologies are widely available, but business owners in existing facilities often lack awareness of these technologies, or else lack the funds to upgrade their equipment and thus take advantage of increased efficiency. Because NSTAR pays for such a substantial portion of all retrofit costs, the Retrofit Programs provide unique opportunities to target these facilities and give business owners the chance to upgrade their equipment and reduce their utility bills while at the same time reducing emissions. Many businesses will have older

† Commercial and industrial emissions were not delineated separately in the ICLEI report.

Table 1. Breakout of Somerville Businesses by Number of Employees per Business

	Number of Employees									
	unknown	1	2 to 4	5 to 9	10 to 24	25 to 49	50 to 99	100 to 249	250 to 499	Total Businesses
Number of Businesses	192	558	958	267	227	74	35	27	4	2,342
% of Total Businesses	8.2	23.8	40.9	11.4	9.7	3.2	1.5	1.2	0.2	
Cumulative % Total Businesses	8.2	32.0	72.9	84.3	94.0	97.2	98.7	99.8	100.0	

Source: Dun & Bradstreet's iMarket database, Q4 2002

equipment that will eventually wear out and require replacement; rather than replacing with the least-cost option, business owners can leverage the NSTAR program to replace their equipment with high quality, high efficiency models at little or no added cost.

Program participation often yields benefits other than increased efficiency, lower electric bills, and reduced emissions. These benefits may include:

- ❍ A brighter facility, particularly attractive to retail establishments: newer, more efficient fluorescent lamps are roughly 10 to 20 percent brighter than older, less efficient models. Upgrading to efficient models may also reduce the total number of lamps needed;
- ❍ Increased building comfort for employees, customers, and/or tenants with HVAC upgrades;
- ❍ Better indoor air quality through improvements to heating, ventilation, and air conditioning (HVAC) systems, as well as reduced exterior envelope air leakage that often leads to condensation and mold growth;
- ❍ Quieter equipment operation for HVAC and other mechanical systems; and/or
- ❍ Improved equipment safety and reliability (as energy efficiency is frequently bundled with higher quality components).

Presently, the NSTAR program offers an excellent opportunity for businesses in the city, and while there is no indication that these programs will cease to be available in the near future, these programs must be viewed only as a "First Step." Even if the NSTAR program were not available, energy efficiency is an effective cost-savings mechanism for businesses. Energy efficiency should be promoted in the City even in the absence of utility support.

Person or agency to implement recommendation

The Commission will be the agency primarily responsible for encouraging local businesses to undertake energy efficiency upgrades. The local Chamber of Commerce, other business groups within the community, NSTAR's Commercial Energy Efficiency Program Manager, and representatives from Harris Energy are all key components of this undertaking. Efforts have already been made to foster communication among these entities, including a presentation by NSTAR and Harris Energy at the January 2003 meeting of the Board of Directors of the Somerville Chamber of Commerce. Additional efforts must be made to reach out to other business groups within the community; for example, the Davis Square Business Association, Union Square Business Association, and others.

Implementation steps

❍ Discuss opportunities to increase participation of businesses the City in NSTAR's Small Business Energy Efficiency Program with representatives from NSTAR. This step has already begun.
❍ Foster discussion between/among NSTAR program representatives, NSTAR's installation contractor (Harris), local business owners, the local Chamber of Commerce, and other business groups in the city. To this end, NSTAR and a CEUCC representative have already made a brief presentation at the Chamber of Commerce Board of Directors Meeting on January 29, 2003. Information from this meeting (including contact information for a CEUCC representative and appropriate contacts at NSTAR and Harris) was disseminated (faxed) to members of the Chamber on March 9, 2003. As of early April 2003, at least half a dozen businesses in the city have contacted NSTAR as a result of this faxed notice.
❍ Disseminate information to the business community through the ***Somerville Journal*** and other local publications. An initial article describing NSTAR programs available to businesses in the city and discussing some of the success stories described below will be submitted during the summer of 2003.
❍ Keep track of energy savings estimates for each Retrofit Program participant, using data provided by Harris Energy from the free energy audits conducted at each business prior to retrofitting.
❍ Develop a decal that businesses (and other entities, such as churches) can display to indicate their participation in a program that reduces energy consumption and greenhouse gas emissions.

Budget/cost implications

Costs for this action item are primarily related to program promotion and publicity. These costs include window placards or decals for past and future participants in the NSTAR programs. Decals are available online at reasonable prices; for example, 500 three-color decals (between 6 and 10 inches square) would cost approximately $0.76 each, or $380.00, plus shipping, for a total of roughly $400.00. Five hundred decals would be more than enough to cover past participants and with enough left over to distribute to future program participants as well.

Other cost-free publicity is available through the ***Somerville Journal***, the Somerville Chamber of Commerce, and other business groups in the city.

Sources of funds

NSTAR and business owners seeking to implement energy efficiency upgrades in their establishments. The CEUCC will help raise funds for additional incidental costs (e.g., window decals).

Overcoming potential obstacles

Several barriers exist to implementing this action item. These include:

❍ Trust issues: Business owners may not understand a utility company's desires to "help them save money;" frequently encountered is the perspective that it makes little sense for someone selling electricity to help an electric customer in such a way that results in the customer buying less electricity from the utility.
❍ Paperwork associated with utility programs: Many business owners assume that the application process for these types of programs is too time-consuming.
❍ Lack of awareness/understanding: Only a small proportion of businesses are aware of available programs, and still fewer understand the programs' potential.
❍ Initial investment costs: Even though calculated payback times on investments are excellent (generally less than six months for program

retrofits and usually no more than one year, business owners may not be willing or able to make up-front investments in energy efficiency upgrades).

While each of these barriers is a serious one, education is the key to addressing most of them. As business owners learn more about program offerings, the first three obstacles should be overcome. Funding for these programs comes from the Systems Benefit charge on each utility customer's electric bill, so in essence the utility's customers are paying for the program themselves. Paperwork associated with the program is minimal: most applications require that business-owners fill out a one-page form with very basic information (name of establishment, address, owner, etc.). The CEUCC has already begun promoting the program in concert with NSTAR and the Somerville Chamber of Commerce, and additional promotional events will take place to increase awareness.

The final obstacle is perhaps the greatest challenge, but because the utility pays for such a large portion of retrofit costs, it is likely that the majority of businesses can afford a few basic upgrades to lighting or HVAC equipment.

Measures of success

The number of businesses that become involved will determine the success of this initiative.

References/Resources

Valuable resources for information on NSTAR's energy efficiency programs include:

1. Augustine ("Augie") Pimentel, Small C&I Retrofit Program Manager, NSTAR: (781) 441-8705
2. Harris Energy (Program installation contractor): (617) 671-4507
3. NSTAR also offers services for business energy analyses, construction programs, retrofit programs, small business retrofit programs, premium efficiency motors, high-efficiency cooling, efficient lighting design, manufacturing and process efficiency, compressed air efficiency, and building operator training. For information on these products and services, interested parties should contact NSTAR at (781) 441-8592.
4. Other valuable references for business energy efficiency include:
   - ❍ Alliance to Save EnergyL www.ase.org
   - ❍ Consortium for Energy Efficiency: www.efficiencyvermont.com
   - ❍ Efficiency Vermont: www.efficiencyvermont.com
   - ❍ Iowa Energy Center Commercial Energy Efficiency Information: www.energy.iastate.edu/efficiency/commercial
   - ❍ Los Angeles Department of Water and Power: www.ladwp.com/energyadvisor/home.html
   - ❍ EnergyGuide.Com - includes an online energy consumption analysis tool: www.energyguide.com
   - ❍ United States Department of Energy's Energy Efficiency and Renewables Network: www.eren.doe.gov/buildings/commercial.html

Success stories

Table 2 lists businesses in Somerville that have already participated in the Small Commercial and Industrial Retrofit program as well as projections of their electricity savings and cost savings.

Table 2. Past Participants in NSTAR Small C&I Retrofit Program and Estimated Electricity/Cost Savings

Program Participant	Address	KWhSaved	Annual Savings ($)
James A Kiley Company	15 Linwood St	69,521.80	6,952.18
Central Bank	399 Highland Ave	57,865.90	5,786.59
Mass Envelope Plus	30 Cobble Hill Rd	47,064.60	4,706.46
Downtown Wine & Spirits	225 Elm St	42,693.00	3,970.45
Pico's	329 Somerville Ave	42,561.00	3,958.17
Highland Auto	625 McGrath Hwy	40,778.40	4,077.84
Tracer Technology Inc	20 Assembly Sq Dr	37,039.30	3,703.93
St. Benedict's School	17 Franklin St	35,429.50	3,542.95
Bairos Liquors	78 Broadway	33,786.00	3,142.10
Tracer Technology Inc	20 Assembly Sq Dr	31,244.90	3,124.49
Winter Hill Market	269 Broadway	30,896.00	2,873.33
Joe's Liquors	160-166 Broadway	27,299.00	2,538.81
Capone Foods	14 Bow St	25,379.00	2,360.25
MVP Liquors/Sav Mor	2153 Mystic Valley Pkwy	24,959.00	2,321.19
Teele Square Liquors	1119 Broadway	18,894.00	1,757.14
Ball Square Liquors	716 Broadway	18,423.00	1,713.34
Tony's Food Land	104 Broadway	16,957.00	1,577.00
Altitude	363 Highland Ave	16,792.90	1,679.29
Broadway Market	350 Broadway	15,954.00	1,483.72
Fellsway Auto Repair	693 McGrath Highway	15,439.00	1,543.90
Somerville Wine & Spirits	235 Highland Ave	14,795.00	1,375.94
Vicente Bros Inspection Station	345 Medford St	14,171.20	1,417.12
99 Restaurants	20 Cummings St	14,150.00	1,315.95
Powder House Convenience	850 Broadway St	13,191.70	1,319.17
JW Howard Flowers	289 Broadway	11,643.00	1,082.80
Amigo's Market	86 Broadway	11,113.00	1,033.51
Victor's Convenience	849 Highland Ave	10,518.00	978.17
YNOT Variety	140 Willow Ave	10,420.60	1,042.06
Joe's Liquor	164 Broadway St	10,181.80	1,018.18
O'Brien's Liquors	158 Highland Ave	10,141.00	943.11
Highland Market	22 Highland Ave	10,108.00	940.04
Trans Liquor Mart	545 McGrath Hwy	9,755.00	907.22
Fleming Printing Co	40 White St	9,681.70	968.17
Minute Market	141 Broadway	9,313.00	866.11
Tracer Technology Inc	20 North Union St	8,623.40	862.34
Country Auto Repair	103 Washington St	8,136.00	931.50
Joy St Realty Trust-Phase II	86 Joy St	7,753.20	775.32
Two Dads Sub Shop	38 Gross St	7,585.80	758.58
John Matthews Variety Store	433 Medford St	7,469.50	746.95
Tracer Technology Inc	North Union St	7,136.40	713.64
Gerald LaFee/Thurston Spa	393 Medford St	6,971.30	697.13
Casa De Carnes	38 Bow St	6,246.00	580.88
Acme Piano Co.	10 Garfield St	5,906.60	590.66
Alex Autobody Shop	75 Washington St	5,345.20	534.52
All Seasons Home Remodeling	369 Somerville Ave	4,519.70	451.97
LaPiana Ins. Agency	83 Broadway	3,494.40	349.44
Midcross Inc/Robi Tools	168 Broadway	3,461.30	346.13
Margies Salon	389 Medford St	3,018.10	301.81
LA International Food Corp	318 Somerville Ave	2,938.00	273.23
Latino Style Beauty Salon	497 Somerville Ave	2,781.20	278.12
Riley's Garage	63 Washington St	2,565.56	256.56
Mass Barber & Beauty Supply	321A Broadwway	1,844.80	184.48

Action Item 9
Promote Green Practices in New Construction and Renovation

Goal and timeframe

Project managers will be encouraged to adopt "green building" practices for new construction and during renovation of existing commercial and industrial buildings through an incentive-based zoning and permitting process that will be implemented by 2004. At least 10% of new buildings or renovations should follow recommended practices by 2007 and 20% by 2010.

The steps toward this goal include:

- ❍ Requiring project managers for all new or renovated commercial and industrial buildings in Somerville to fill out a Leadership in Energy and Environmental Design (LEED) rating score sheet, regardless of their intention to obtain a LEED rating.†
- ❍ Providing builders and designers with information on green building practices and green building consultants in the area who can assist in filling out the LEED score sheet.
- ❍ Strongly recommending that all new or renovated commercial and industrial large development projects (over 50,000 square feet) in Somerville meet a LEED silver rating and have a minimum of three points in the energy section.
- ❍ Giving permitting priority and reducing permit processing time for buildings that meet or exceed a LEED silver rating and have a minimum of three points in the energy section.
- ❍ Giving special consideration for variances in zoning requirements (i.e. building density, green space, parking), within the limits of the planning board's powers, to buildings that meet or exceed a LEED silver rating and have a minimum of three points in the energy section.

Projected greenhouse gas emissions reduction

Greenhouse gas emissions will depend on standards chosen during the building process and the extent to which adopted measures are improvements over baseline levels. We feel confident in saying, however, that reductions will be significant.

As an example, a public school built in Somerville that incorporated green building practices saved 311,790 kWh/yr in electricity and 1,090 MMBtu/yr in natural gas, which translates into 281 tons of CO_2 avoided per year.

Reason for recommendation

Buildings can represent one of the highest costs for a commercial or industrial business. Buildings fabricated or renovated using energy-efficient and environmentally beneficial practices can be cost-effective for the companies using them and can bring additional benefits to the communities in which they are built.

Green building methods provide numerous benefits:

- ❍ Increased energy efficiency reduces heating and cooling requirements, thereby decreasing the power requirements for the building and the associated emissions generated by a nonrenewable power source. Efficiency also lowers the size and related cost of the equipment required to maintain a comfortable temperature in the building.

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† The Leadership in Energy and Environmental Design (LEED) rating system was created and is maintained by the United States Green Building Council (USGBC). It is meant to serve as a national standard for green building. A LEED checklist must be filled out for any project that hopes to obtain a LEED rating. It includes areas in which one may obtain points toward a certified, silver, gold, or platinum rating. Points may be earned for sustainable siting, water efficiency, energy efficiency and atmospheric effects, materials and resources, and indoor environmental quality.

Green Building Success Stories

The processes of planning for an IKEA store in accordance with the LEED silver rating and building the Capuano school to meet a LEED Certification rating have brought new insights and lessons about the potential of green building.

The Capuano School is a perfect example of the benefits that a green building can bring to a community. This "High Performance Green School" was designed and built on a public school budget, with additional improvements funded by the utility provider and the Massachusetts Renewable Energy Trust Fund.

The decreased operating costs, when compared to those of a traditional school, give a payback period for the increased initial costs of a couple of years (anything less than 20 years reduces taxpayer costs every year). This is especially true in schools since Somerville receives 90% reimbursement on construction costs from the state but pays for 100% of the energy costs for the life of the facility. Furthermore, the building has several environmental, health, and educational benefits. The combination of these factors make the implementation of green building practices a wise business move for commercial and industrial groups that will also benefit the citizens of Somerville.

- ❍ The use of environmentally conscious materials reduces the total amount of resources required to create the building, decreasing the overall building energy costs and resulting in an indirect decrease in emissions.
- ❍ These building practices take into account the load on the environment in which the structure is located and can deal with phenomena such as water runoff or waste generation in a manner that actually has a positive impact on the building's surroundings.
- ❍ The materials used in the building process are intended to be nontoxic whenever possible, thereby minimizing the potential for conditions that may be hazardous to the health of people living nearby.
- ❍ Finally, a building created using these methods acts as a centerpiece of the community because citizens feel that it makes a positive contribution to the landscape and is a source of pride as an improvement to the environment in which they live.

Person or agency to implement recommendation

- ❍ CEUCC
- ❍ Planning Board in the Office of Housing and Community Development (OCHD)
- ❍ Inspectional Services Department (ISD), Department of Public Works (DPW)
- ❍ Board of Aldermen

Implementation steps

- ❍ CEUCC and Planning board draft a modification to the zoning ordinance that incorporates language describing the environmental building standards and their benefits in addition to the incentives.
- ❍ The Planning Board and ISD must be simultaneously involved in the process of deciding how the incentives will be implemented.
- ❍ The proposal must be brought to the Aldermen for approval of modification of the zoning ordinances.
- ❍ Once the change is approved, the Planning Board and ISD can actually implement incentives and communicate the process to appropriate parties.
- ❍ The CEUCC will be involved in drafting the zoning modification and developing methods to communicate benefits of green building to builders and designers.
- ❍ The CEUCC will provide lists of LEED-certified contractors to ISD.

Budget/cost implications of action item

There will be no direct costs to the City because the incentives are merely modifications of existing permitting or zoning processes. More ambitious incentives, however, such as decreased permitting fees or provision for green building consulting fees, would have associated costs. There may be increased initial costs for builders who use green building practices, but this is not always the case and the the decreased costs of operating a green building often pay for any increased initial costs within a few years.

Sources of funds

There are opportunities over and above municipal support for builders to finance green building practices. The Massachusetts Technology Collaborative's Renewable Energy Trust Fund awards grants for green building upgrades for certain types of buildings. NSTAR has many programs that analyze energy efficiency improvements at no cost to the customer.

Overcoming potential obstacles

Green building practices can save money for a business in the long term, but many companies are fearful of increased initial costs and are unaware of available resources and environmentally conscious contractors. This proposal seeks to

overcome these fears by creating a system whereby businesses are rewarded for following environmentally conscious building practices through the use of incentives. The result is an opportunity to educate those involved in the purchasing, zoning, permitting, designing, and fabrication of a building of the economic and environmental benefits of such practices.

The Planning Board, ISD, and the Aldermen must be informed of the benefits of implementing these standards. This will be an integral part of the implementation process. Once the standards are implemented, it will be a challenge to make sure that builders, architects, engineers, real estate agents, and customers are aware of the incentives and the benefits of the environmental standards. A concerted campaign must be undertaken to inform these parties of the potential benefits.

Measures of success

The primary measure of success will be the percentage of new construction or renovation projects that choose to implement green building practices.

References/Resources

There are several resources available to assist groups interested in utilizing environmentally conscientious building practices. NSTAR, the utility provider for Somerville, has a "New Construction Program"-including financial, technical, and design assistance-that can help improve electrical, mechanical, or structural systems so that they are more energy efficient. Building standards-most notably LEED and the Department of Energy's Energy Star-have been created as a way to judge the energy efficiency and environmental impact of a building. These standards provide numerous guidelines on intelligent building practices and act as a consistent basis by which buildings may be judged.

1. City of Somerville
    - ❍ City web site: www.ci.somerville.ma.us
    - ❍ Zoning/Planning Board, Office of Community and Housing Development: (617) 617.625.6600 Ext. 2500
    - ❍ Contacts:
        - → Stuart O'Brien (zoning): (617) 625.6600, Ext. 2526, sobrien@ci.somerville.ma.us
        - → Kristen Levesque (planning board): (617) 617.625.6600 Ext. 2500
        - → Inspectional Services Department: (617) 617.625.6600 Ext. 5600
        - → Board of Aldermen (contact info on city web site)
2. Green Building
    - ❍ USGBC/LEED: www.usgbc.org/LEED/LEED_main.asp
    - ❍ DOE/Energy Star: www.energystar.gov
    - ❍ Green Building Alliance: www.gbapgh.org/index2.html
3. Local financial support
    - ❍ MTC/MRETF: www.mtpc.org/netmac.asp
    - ❍ NSTAR: www.nstaronline.com
4. Local green building architectural consultation
    - ❍ Courtney Miller: www.ecobuild.com; (781) 646.6165l cma@ecobuild.com
    - ❍ Doug Sacra: www.hmfh.com; (617) 492.2200; sacra@hmfh.com
5. Other incentive programs
    - ❍ Arlington County, VA: www.co.arlington.va.us/des/epo/green.htm
    - ❍ Marin County, CA: www.co.marin.ca.us/depts/CD/main/comdev/advance/BEST/incentive.cfm
    - ❍ Santa Barbara, CA: www.silcom.com/~sbcplan/incent.html